British airways
OVERSEAS DIVISION

Concorde

FLYING MANUAL

Volume II (a)

OPERATING LIMITATIONS	1
EMERGENCY PROCEDURES	2
ABNORMAL PROCEDURES	3
CONDITIONAL PROCEDURES	4
MINIMUM EQUIPMENT LIST	5

Copy No.................

STATEMENT OF INITIAL CERTIFICATION.

This Manual is approved by British Airways Overseas Division in accordance with T.S.S. Standard No. 02.

This Publication forms part of the British Airways Overseas Division Approved Operations Manual.

Prepared by Technical Information Services.

British airways
OVERSEAS DIVISION

REVISION RECORD

Rev No	Date Entered	Initials	Rev No	Date Entered	Initials	Rev No	Date Entered	Initials

LETTER OF TRANSMITTAL NO. 27
AND
LIST OF EFFECTIVE PAGES

The contents of this permanent revision are approved by BA-OD in accordance with TSS Standard No. 0-2.

This manual consists of the following pages, listed to show the latest issue date of each enabling a complete check of all pages to be made.

1. INSERT and/or REMOVE pages as stated below.
2. REMOVE & DESTROY superseded pages.
3. Record this revision number on the Record Sheet.

Chapter Section Page	Date
Frontispiece/	
Revision Record	
List of Eff.Pages	
01.00.01	24 May 79
01.00.02	24 May 79
01.01.01	17 Apr.78
01.01.02	17 Apr.78
01.01.03	1 Dec.76
01.01.04	1 Dec.76
01.01.05	4 May 77
01.01.06	4 May 77
01.01.07	18 Aug.77
01.01.08	18 Aug.77
01.01.09	16 Jun.77
01.01.10	16 Jun.77
01.01.11	24 May 79
01.01.12	24 May 79
01.02.01	17 Jan.77
01.03.01	30 Jul.79
01.03.02	30 Jul.79
01.03.03	24 May 79
01.03.04	24 May 79
01.04.01	3 Sep.76
01.05.01	1 Dec.76
01.05.02	1 Dec.76
01.06.01	24 May 79
01.06.02	24 May 79
01.06.03	24 May 79
01.06.04	24 May 79

Chapter Section Page		Page
01.07.01		9 Feb.77
01.08.01		6 Nov.78
01.09.01		5 Oct.75
01.10.01		5 Oct.75
01.11.01		28 Feb.79
01.11.02		28 Feb.79
01.11.03		9 Feb.77
01.11.04		9 Feb.77
01.11.05		30 Jul.79
01.11.06		30 Jul.79
01.11.07		24 May 79
01.11.08		24 May 79
01.11.09		24 May 79
02.00.01	INSERT	4 Oct.79
02.01.01	INSERT	4 Oct.79
02.01.02	INSERT	4 Oct.79
02.01.03	INSERT	4 Oct.79
02.01.04	INSERT	4 Oct.79
02.01.05		17 Apr.78
02.01.06		17 Apr.78
02.01.07		16 Jun.77
02.01.08		16 Jun.77
02.01.09		7 Dec.77
02.01.10		7 Dec.77
02.01.11		16 Jun.77
02.01.12		16 Jun.77
02.01.13		16 Jun.77
02.01.14		16 Jun.77
02.01.15		16 Jun.77

Chapter Section Page		Date
02.03.01		24 May 79
02.03.02		24 May 79
02.04.01		1 Dec.76
02.04.02		1 Dec.76
02.04.03		7 Dec.77
02.05.01	INSERT	4 Oct.79
02.05.02	INSERT	4 Oct.79
02.05.03	INSERT	4 Oct.79
02.05.04	INSERT	4 Oct.79
02.05.05	INSERT	4 Oct.79
02.05.06	INSERT	4 Oct.79
02.06.01		17 Feb.78
02.06.02		17 Feb.78
02.06.03		17 May 78
02.06.04		17 May 78
02.06.05		17 May 78
02.06.06		17 May 78
02.06.07		7 Dec.77
02.06.08		7 Dec.77
02.06.09		7 Dec.77
02.06.10		7 Dec.77
02.06.11		24 May 79
02.07.01		17 Feb.78
02.10.01		17 Feb.78
02.10.02		17 Feb.78
02.10.03		17 Apr.78
02.10.04		17 Apr.78
02.13.01		7 Dec.77
02.13.02		7 Dec.77
02.13.03		17 Feb.78
02.13.04		17 Feb.78
02.13.05		7 Dec.77
02.13.06		7 Dec.77
02.13.07		7 Dec.77
02.13.08		7 Dec.77

Chapter Section Page		Date
02.14.01		1 Dec.76
02.14.02		1 Dec.76
02.14.03		7 Dec.77
02.14.04		7 Dec.77
02.14.05		7 Dec.77
02.14.06		7 Dec.77
02.14.07		1 Dec.76
02.14.08		1 Dec.76
02.14.09		30 Jul.79
02.14.10		30 Jul.79
02.14.51		1 Dec.76
02.14.52		1 Dec.76
02.14.53		1 Dec.76
02.14.54		1 Dec.76
02.14.55		18 Aug.77
02.14.56		18 Aug.77
02.14.57		1 Dec.76
02.14.58		1 Dec.76
02.14.59		18 Aug.77
02.14.61		1 Dec.76
02.14.62		1 Dec.76
02.14.63		18 Aug.77
02.14.64		18 Aug.77
02.14.65		18 Aug.77
02.14.66		18 Aug.77
02.14.67		18 Aug.77
02.14.68		18 Aug.77
02.14.69		18 Aug.77
02.14.70		18 Aug.77
02.14.71		18 Aug.77
02.14.72		18 Aug.77
03.00.01	INSERT	4 Oct.79
03.00.02	INSERT	4 Oct.79
03.00.03	INSERT	4 Oct.79
03.00.04	INSERT	4 Oct.79
03.01.01		1 Dec.76
03.01.02		1 Dec.76
03.01.03		6 Jul.78
03.01.04		6 Jul.78
03.01.05		1 Dec.76
03.01.06		1 Dec.76
03.01.07		1 Dec.76
03.01.08		1 Dec.76
03.01.09		16 Jun.77
03.01.10		16 Jun.77
03.01.11		16 Jun.77
03.01.12		16 Jun.77
03.01.13		16 Jun.77
03.01.14		16 Jun.77

Chapter Section Page		Date
03.01 (Contd)		
03.01.15		7 Dec.77
03.01.16		7 Dec.77
03.01.17		7 Dec.77
03.01.18		7 Dec.77
03.01.19		7 Dec.77
03.01.20		7 Dec.77
03.01.21		1 Dec.76
03.01.22		1 Dec.76
03.01.23		1 Dec.76
03.01.24		1 Dec.76
03.01.25		28 Feb.79
03.01.26		28 Feb.79
03.01.27		1 Dec.76
03.01.28		1 Dec.76
03.01.29		1 Dec.76
03.01.30		1 Dec.76
03.01.31		1 Dec.76
03.01.32		1 Dec.76
03.01.33		7 Dec.77
03.01.34		7 Dec.77
03.01.35		6 Nov.78
03.01.36		6 Nov.78
03.01.37		28 Feb.79
03.01.38		28 Feb.79
03.01.39		15 Mar.77
03.01.40		15 Mar.77
03.01.41		15 Mar.77
03.01.42		15 Mar.77
03.01.43		6 Jul.78
03.01.44		6 Jul.78
03.01.45	INSERT	4 Oct.79
03.01.46	INSERT	4 Oct.79
03.01.47	INSERT	4 Oct.79
03.01.48	INSERT	4 Oct.79
03.01.49	INSERT	4 Oct.79
03.01.50	INSERT	4 Oct.79
03.01.51	INSERT	4 Oct.79
03.01.52	INSERT	4 Oct.79
03.01.53	INSERT	4 Oct.79
03.01.54	INSERT	4 Oct.79
03.01.55	INSERT	4 Oct.79
03.01.56	INSERT	4 Oct.79
03.01.57	INSERT	4 Oct.79
03.01.58	INSERT	4 Oct.79
03.02.01		1 Dec.76
03.02.02		1 Dec.76
03.02.03		1 Dec.76
03.02.04		1 Dec.76
03.02.05		1 Dec.76
03.02.06		1 Dec.76
03.02.07		7 Dec.77
03.02.08		7 Dec.77
03.02.09		1 Dec.76
03.02.10		1 Dec.76

Chapter Section Page		Date
03.02 (Contd)		
03.02.11		1 Dec.76
03.02.12		1 Dec.76
03.02.13		1 Dec.76
03.02.14		1 Dec.76
03.02.15		1 Dec.76
03.02.16		1 Dec.76
03.02.17		1 Dec.76
03.02.18		1 Dec.76
03.02.19		6 Nov.78
03.02.20		6 Nov.78
03.02.21		1 Dec.76
03.02.22		1 Dec.76
03.02.23		1 Dec.76
03.02.24		1 Dec.76
03.02.25		17 Feb.78
03.02.26		17 Feb.78
03.02.27		17 Feb.78
03.02.28		17 Feb.78
03.02.29		4 May 77
03.02.30		4 May 77
03.03.01		18 Aug.77
03.03.02		18 Aug.77
03.03.03		1 Dec.76
03.03.04		1 Dec.76
03.03.05		4 Sep.78
03.04.01		30 Jul.79
03.04.02		30 Jul.79
03.04.03		30 Jul.79
03.04.04		30 Jul.79
03.04.05	INSERT	4 Oct.79
03.04.06	INSERT	4 Oct.79
03.04.07	INSERT	4 Oct.79
03.04.08	INSERT	4 Oct.79
03.04.09		7 Dec.77
03.05.01	INSERT	4 Oct.79
03.05.02	INSERT	4 Oct.79
03.05.03		24 May 79
03.05.04		24 May 79
03.05.05		1 Dec.76
03.05.06		1 Dec.76
03.05.07		16 Jun.77
03.05.08		16 Jun.77

Chapter Section Page		Date	Chapter Section Page	Date
03.06.01		1 Dec.76	03.10.01	17 Apr.78
03.06.02		1 Dec.76	03.10.02	17 Apr.78
03.06.03		1 Dec.76	03.10.03	17 Apr.78
03.06.04		1 Dec.76	03.10.04	17 Apr.78
03.06.05		1 Dec.76	03.10.05	17 Apr.78
03.06.06		1 Dec.76	03.10.06	17 Apr.78
03.06.07		24 May 79	03.10.07	1 Dec.76
03.06.08		24 May 79	03.10.08	1 Dec.76
03.06.09		1 Dec.76	03.10.09	1 Dec.76
03.06.10		1 Dec.76	03.10.10	1 Dec.76
03.06.11		1 Dec.76	03.10.11	7 Dec.77
03.06.12		1 Dec.76	03.10.12	7 Dec.77
03.06.13		1 Dec.76	03.10.13	1 Dec.76
03.06.14		1 Dec.76	03.10.14	1 Dec.76
03.06.15		1 Dec.76	03.10.15	1 Dec.76
03.06.16		1 Dec.76	03.10.16	1 Dec.76
03.06.17		16 Jun.77	03.10.17	1 Dec.76
03.06.18		16 Jun.77	03.10.18	1 Dec.76
03.06.19		16 Jun.77	03.10.19	1 Dec.76
03.06.20		16 Jun.77	03.10.20	1 Dec.76
			03.10.21	7 Dec.77
			03.10.22	7 Dec.77
03.07.01		1 Dec.76		
03.07.02		1 Dec.76		
03.07.03		7 Dec.77	03.11.01	1 Dec.76
03.07.04		7 Dec.77	03.11.02	1 Dec.76
03.07.05		1 Dec.76		
03.07.06		1 Dec.76		
03.07.07		30 Jul.79	03.12.01	6 Jul.78
03.07.08		30 Jul.79	03.12.02	6 Jul.78
03.07.09		6 Jul.78	03.12.03	1 Dec.76
03.07.10		6 Jul.78	03.12.04	1 Dec.76
03.07.11		7 Dec.77	03.12.05	7 Dec.77
03.07.12		7 Dec.77	03.12.06	7 Dec.77
03.07.13		16 Jun.77	03.12.07	15 Mar.77
03.07.14		16 Jun.77	03.12.08	15 Mar.77
03.07.15		6 Jul.78	03.12.09	1 Dec.76
03.07.16		6 Jul.78	03.12.10	1 Dec.76
			03.12.11	6 Nov,78
03.08.01		30 Jul.79	03.12.12	6 Nov.78
03.08.02		30 Jul.79		
03.08.03	INSERT	4 Oct.79		
03.08.04	INSERT	4 Oct.79		
03.08.05	INSERT	4 Oct.79	03.13.01	1 Dec.76
03.08.06	INSERT	4 Oct.79	03.13.02	1 Dec.76
03.08.07		1 Dec.76	03.13.03	17 Feb.78
03.08.08		1 Dec.76	03.13.04	17 Feb.78
			03.14.01	1 Dec.76
			03.14.02	1 Dec.76
			03.14.03	1 Dec.76
			03.14.04	1 Dec.76

Chapter Section Page	Date
04.00.01	24 May 79
04.00.02	24 May 79
04.01.01	4 May 77
04.01.02	4 May 77
04.01.03	4 May 77
04.01.04	4 May 77
04.01.05	4 May 77
04.01.06	4 May 77
04.02.01	4 May 77
04.02.02	4 May 77
04.02.03	30 Dec.77
04.02.04	30 Dec.77
04.02.05	30 Dec.77
04.02.06	30 Dec.77
04.02.07	4 May 77
04.07.01	4 May 77
04.07.02	4 May 77
04.07.03	4 May 77
04.08.01	4 May 77
04.11.01	4 May 77
04.11.02	4 May 77
04.12.01	4 May 77
04.12.02	4 May 77
04.12.03	6 Nov.78
04.12.04	6 Nov.78
04.12.05	4 May 77
04.14.01	4 May 77
04.14.02	4 May 77
04.14.03	4 May 77
04.14.04	4 May 77
04.14.05	4 May 77
04.14.06	4 May 77
04.14.07	4 May 77
04.14.08	4 May 77
04.14.09	16 Jun.77
04.14.10	16 Jun.77
04.14.11	16 Jun.77
04.14.12	16 Jun.77
04.14.13	30 Dec.77
04.14.14	30 Dec.77
04.14.15	24 May 79
04.14.16	24 May 79
04.14.17	24 May 79

Chapter Section Page		Date
04.14.18		24 May 79
04.14.19		24 May 79
04.14.20		24 May 79
04.14.21		24 May 79
05.00.01		6 Jul.78
05.01.01		6 Nov.78
05.01.02		6 Nov.78
05.02.01	INSERT	4 Oct.79
05.02.02	INSERT	4 Oct.79
05.02.03	INSERT	4 Oct.79
05.02.04	INSERT	4 Oct.79
05.02.05		4 Sep.78
05.02.06		4 Sep.78
05.02.07	INSERT	4 Oct.79
05.02.08	INSERT	4 Oct.79
05.02.09		28 Feb.79
05.02.10		28 Feb.79
05.02.11	INSERT	4 Oct.79
05.02.12	INSERT	4 Oct.79
05.02.13	INSERT	4 Oct.79
05.02.14	INSERT	4 Oct.79
05.02.15		28 Feb.79
05.02.16		28 Feb.79
05.02.17	INSERT	4 Oct.79
05.02.18	INSERT	4 Oct.79
05.02.19	INSERT	4 Oct.79
05.02.20	INSERT	4 Oct.79
05.02.21		28 Feb.79
05.02.22		28 Feb.79
05.02.23	INSERT	4 Oct.79
05.02.24	INSERT	4 Oct.79
05.02.25		9 Feb.77
05.02.26		9 Feb.77
05.02.27		24 May 79
05.02.28		24 May 79
05.02.29		6 Nov.78
05.02.30		6 Nov.78
05.02.31	INSERT	4 Oct.79
05.02.32	INSERT	4 Oct.79
05.02.33		28 Feb.79
05.02.34		28 Feb.79
05.02.35		6 Nov.78
05.02.36		6 Nov.78
05.02.37	INSERT	4 Oct.79
05.02.38	INSERT	4 Oct.79
05.02.39		6 Nov.78
05.02.40		6 Nov.78
05.02.41	INSERT	4 Oct.79
05.02.42	INSERT	4 Oct.79
05.02.43	INSERT	4 Oct.79
05.02.44	INSERT	4 Oct.79
05.02.45	INSERT	4 Oct.79
05.02.46	INSERT	4 Oct.79
05.02.47	INSERT	4 Oct.79
05.02.48	INSERT	4 Oct.79

Chapter Section Page		Date	Chapter Section Page	Date
05.03.01		17 Apr.78		
05.03.02		17 Apr.78		
05.03.03		24 May 79		
05.03.04		24 May 79		
05.03.04A		24 May 79		
05.03.04B		24 May 79		
05.03.05	INSERT	4 Oct.79		
05.03.06	INSERT	4 Oct.79		
05.03.07		16 Jun.77		
05.03.08		16 Jun.77		
05.03.09	INSERT	4 Oct.79		
05.03.10	INSERT	4 Oct.79		
05.03.11	INSERT	4 Oct.79		
05.03.12	INSERT	4 Oct.79		
05.03.13	INSERT	4 Oct.79		
05.03.14	INSERT	4 Oct.79		
05.03.15	INSERT	4 Oct.79		
05.03.16	INSERT	4 Oct.79		
05.03.17	INSERT	4 Oct.79		
05.03.18	INSERT	4 Oct.79		
05.03.18A	INSERT	4 Oct.79		
05.03.18B	INSERT	4 Oct.79		
05.03.19	INSERT	4 Oct.79		
05.03.20	INSERT	4 Oct.79		
05.03.21	INSERT	4 Oct.79		
05.03.22	INSERT	4 Oct.79		
05.03.23	INSERT	4 Oct.79		
05.03.24	INSERT	4 Oct.79		
05.03.25	INSERT	4 Oct.79		
05.03.26	INSERT	4 Oct.79		
05.03.26A	REMOVE	24 May 79		
05.03.26B	REMOVE	24 May 79		
05.03.27	INSERT	4 Oct.79		
05.03.28	INSERT	4 Oct.79		
05.03.29	INSERT	4 Oct.79		
05.03.30	INSERT	4 Oct.79		
05.03.31	INSERT	4 Oct.79		
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05.03.34	INSERT	4 Oct.79		
05.03.35	INSERT	4 Oct.79		
05.03.36	INSERT	4 Oct.79		
05.03.37	INSERT	4 Oct.79		
05.03.38	INSERT	4 Oct.79		
05.03.39	INSERT	4 Oct.79		
05.03.40	INSERT	4 Oct.79		
05.03.41	INSERT	4 Oct.79		
05.03.42	INSERT	4 Oct.79		
05.03.43	INSERT	4 Oct.79		
05.03.44	INSERT	4 Oct.79		
05.03.45	INSERT	4 Oct.79		
05.03.46	INSERT	4 Oct.79		
05.03.47	INSERT	4 Oct.79		
05.03.48	INSERT	4 Oct.79		
05.03.49	INSERT	4 Oct.79		

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TEMPORARY REVISION RECORD SHEET

Rev No	Date Entered	Initials	Rev No	Date Entered	Initials	Rev No	Date Entered	Initials
1	7.9.76	M.G						
2	17.9.76	M.G						
~~3~~	~~9.10.76~~	~~AO~~						
3	20.12.76	MA						
4								
5	1-2-77	MA						
6	4-3-77	Um						
7	?	?						
8	25/8 77	M.G						
9	5 9 77	Um						
10	21-9-77	Um						
11	21.12.77	BA						
12	6.2.78	RGC						
13	17.5.78							
14	21.6.78							
15	22.7.78	BD						
16	13.12.78							
17	21/3/79							
18	22/8/79	AM						
19	22.10.79	HL						

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TEMPORARY REVISION RECORD SHEET

Rev No	Date Entered	Initials	Rev No	Date Entered	Initials	Rev No	Date Entered	Initials

LETTER OF TRANSMITTAL

TEMPORARY REVISION NO. 19

The contents of this temporary revision index are approved by BA-OD in accordance with TSS Standard No. O-2.

PROCEDURE:
1. Insert attached pages.
2. File this page immediately following Frontispiece/Revision Record.
3. Record this revision on the Temporary Revision Record Sheet.

Chapter Section		Facing Page	Date
01.11	INSERT	01	4 Oct.79
02.04		02	1 Dec.78
02.14		57	16 Dec.77
02.70		70	16 Dec.77
03.02		23	1 Dec.76
		28	1 Dec.76
05.02		13	18 Aug.77
	INSERT	22	4 Oct.79
05.03		15	15 Sep.77

British airways
OVERSEAS DIVISION

SUPPLEMENTARY REVISION RECORD SHEET

Rev No	Date Entered	Initials	Rev No	Date Entered	Initials	Rev No	Date Entered	Initials
0								

British airways
OVERSEAS DIVISION

SUPPLEMENTARY REVISION RECORD SHEET

Rev No	Date Entered	Initials	Rev No	Date Entered	Initials	Rev No	Date Entered	Initials

British airways
OVERSEAS DIVISION

CONCORDE FLYING MANUAL

Volume II (a)/(b)

This present copy of the Flying Manual has been prepared and printed from pages previously forming part of the Flight Crew Operating Manual.

Subsequent revisions will correct headings so that all pages will be entitled Concorde Flying Manual.

LIST OF CONTENTS

Airplane General

Maximum Permissible Weight 01.01.01

Performance

Snow, Frost and Ice 01.01.02
Weight 01.01.02
Airfield Altitudes 01.01.02
Maximum Crosswind Components 01.01.02
Minimum Runway Width 01.01.02
Runway Gradient 01.01.02
Runway Conditions 01.01.02
Roughness 01.01.02
Slush/Standing Water/Snow 01.01.02
Brake Energy for an Accelerate-Stop 01.01.03

Load Factor and Centre of Gravity

Load Factor 01.01.05
Centre of Gravity 01.01.05

Speed

In-Flight CG Limits 01.01.06
Flight Envelope 01.01.07
Flight Envelope 01.01.08
Mach/CG 01.01.09
Nose/Visor 01.01.10
Landing Gear 01.01.10
Main Landing and Land/Taxi Lamps 01.01.10
Windscreen Wiper Operation 01.01.10
Side Vision Window 01.01.10

Operational

Type of Operation 01.01.11
Minimum Crew 01.01.11
Maximum Number of Occupants 01.01.11
Altitude/Temperature Limits 01.01.11

Miscellaneous

Crew Seats 01.01.12
Passenger Luggage Bins 01.01.12
Smoking 01.01.12
Limits Indicated by Instrument Colour Coding 01.01.12

Systems

Air Conditioning and Pressurization

Rack Cooling and Air Generation 01.02.01
Cabin Differential Pressure 01.02.01

Automatic Flight

Autopilot, including Cat 2 and Cat 3 Operations 01.03.01
Flight Director 01.03.02
Autothrottle 01.03.02

Electrical
  Main Generators 01.04.01
  Emergency Generator 01.04.01
  Transformer Rectifier Units 01.04.01
  Constant Speed Drive 01.04.01
  Split System Breaker (SSB) 01.04.01
  Batteries 01.04.01
  Manual Paralleling 01.04.01

Flight Controls
  Pitch Control Forces 01.05.01
  Blue or Green System Spool Valve Jam 01.05.01
  Flight Control Position Indicator Warning 01.05.01
  Inverter Failure Warning 01.05.01
  Loss of Two Artificial Feel Systems 01.05.02

Fuel System
  Fuel Loading 01.06.01
  Refuelling with Passengers on Board 01.06.01
  Minimum Fuel Load for Go-Around/Baulked Landing 01.06.01
  Approved Fuels and Additives 01.06.02
  Approved Oils 01.06.04

Hydraulic Power
  Engine Driven Pump 01.07.01
  Auxiliary Compressor 01.07.01

Landing Gear
  Brakes 01.08.01
  Gear O/Ride 01.08.01
  Taxiing 01.08.01

Navigation Systems
  INS Alignment 01.09.01
  ADC Comparator Failure 01.09.01

Nose and Visor
  Nose/Visor 01.10.01
  Parking 01.10.01

Power Plant
  Engine
    Placarded Limitations 01.11.01
    Oil, Fuel, TCA, Air Turbine Starter and Throttle Limitations 01.11.01
    EGT Limitations 01.11.03
    Ground Starting 01.11.04
    Restricted Speed Bands 01.11.04
    Relight Envelope 01.11.05
    Ground Running in Icing Conditions 01.11.05
    Engine Overspeed 01.11.05
    Engine Control Schedules 01.11.06
    Use of Reheat 01.11.06

  Nacelle
    Forward Thrust 01.11.07
    Reverse Thrust (Ground) 01.11.07
    Reverse Thrust (Flight) 01.11.08

  Intake and Secondary Nozzle
    Secondary Air Doors 01.11.09
    Secondary Nozzle 01.11.09

AIRPLANE CONTROL

MAXIMUM PERMISSIBLE WEIGHTS

Taxiing	186,880 kgs
Start of Take-off	185,070 kgs
Landing	111,130 kgs
Zero Fuel (includes unusable fuel)	92,080 kgs

NOTE

See Performance Manual for individual airfield structural take-off weight limitations

Baggage Holds

	LOAD		
	Total	Runway Load Limit	Floor Strength Limit
Under Floor Hold		320 kg/m(95 kg/ft)	488 kg/m^2(45 kg/ft^2)
Forward of door Aft of door	995kg 585kg		
Rear Hold		670 kg/m(205kg/ft)	488 kg/m^2 (45 kg/ft^2)
Lashed freight OR Unlashed freight	2,767kg 2,268kg		

(Unchanged)

PERFORMANCE

Snow, Frost and Ice

With the exception of the areas defined below, the aircraft must be clear of snow, frost and ice before take-off.

(1) Frost and ice are permissible on the underside of the wing, provided that they are confined to the general area of the fuel tanks and that the depth does not exceed 3mm.

(2) Thin hoar frost is permissible on all external surfaces provided that the ADC static vents and standby probe are clear.

Weight

The weights given in Vol.II.01.01.01 are maximum structural design weights. Lower take-off and landing weights may be required due to performance considerations. The limiting weights must be determined for each flight.

Airfield Altitudes

	Minimum	Maximum
For take-off and landing	-1,000 ft	8,000 ft

MAXIMUM CROSSWIND

The maximum crosswind component for take-off and landing is 30 kt.

Minimum Runway Width

150 ft

Runway Gradient

Maximum effective gradient for take-off and landing	±2%

Runway Conditions

Roughness

At weights above 130,000 kgs with passengers, or 135,000 kgs without passengers, operation of the aircraft is limited to runways listed in Performance Manual Section 1.

(Deletion)

Slush/Standing Water/Snow

(a) The aircraft is cleared to operate, without limitation, from "nominally clear" runways.

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(b) The aircraft is cleared to operate from "precipitation covered" runways. See Performance Manual section 5 for performance penalty.

A 15 kt crosswind component limitation must be observed when operating from "precipitation covered" runways. Where the precipitation is water, slush, or wet snow, the maximum depth must not exceed 13 mm. Where the precipitation is dry snow, the maximum depth must not exceed 50 mm.

NOTE: A runway is considered to be "precipitation covered" when the average depth of precipitation which covers all or most of the runway exceeds 3 mm. Such water depths could occur when melted slush is trapped on the runway, but is extremely unlikely as a result of rain alone, unless torrential rain is combined with a crosswind which prevents water drainage from the runway. Such conditions are unlikely to persist for more than about 15 minutes.

Brake Energy for an Accelerate-Stop

Maximum permitted: 70×10^6 joules per brake.

LEFT BLANK INTENTIONALLY

(Unchanged)

LOAD FACTOR AND CENTRE OF GRAVITY

Load Factor - -1.0 to +2.5g

Centre of Gravity

The aircraft must not be taxied with a PTOBO in excess of:-

3300 kgs for a 53.5% take-off
1800 kgs for a 54% take-off

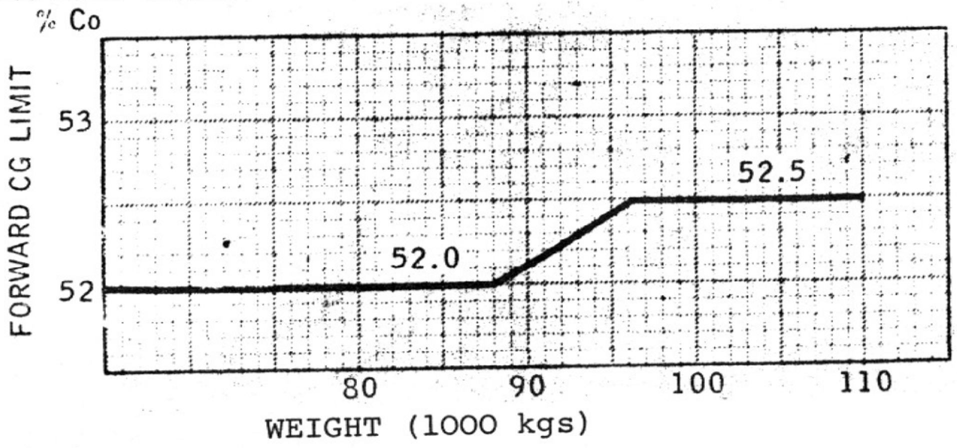
Take-off: Take-off is only permitted with the aircraft CG in one of the following three specified positions:-

53.0% for Take-off weights less than 140,000 kg.) See
This is necessary to avoid spurious M/CG warnings.) NOTE
Take-off must not be commenced with a M/CG warning) below

53.5% for Take-off weights of 140,000 Kg or more and fuel loads up to the 53.5% Co maximum quoted in Table 5 of the Load & Balance Manual.

54.0% when it is necessary to carry a fuel load in excess of the 53.5% Co Take-off maxima quoted in Table 5 of the Load & Balance Manual.

Landing: Rear Limit: 53.5% Co
Forward Limit:



In-Flight: See pages 01.01.06 and 01.01.09
(CG and flight envelope limits are also given on Page 9).

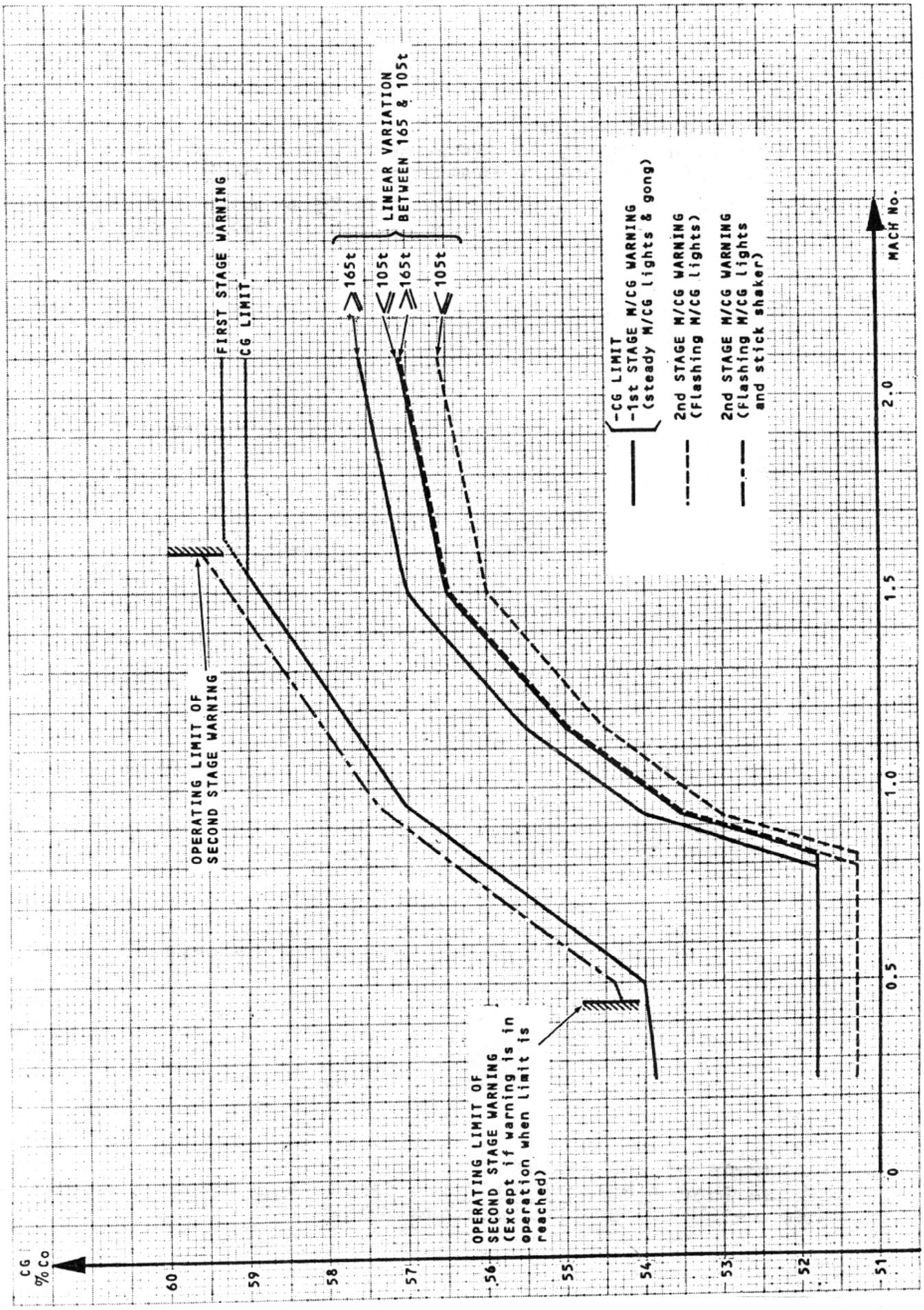
NOTE: Three balance charts are provided for 53.0, 53.5 and 54.0% Co Take-off CG and the standard fuel distribution together with the appropriate fuel transfer/fuel burn off quantities will ensure the respective nominal take-off CG position is achieved.

CG indication system errors of up to ± 0.3% are possible. Provided that the fuel is correctly distributed, take-off is permitted if the indicated CG position is within ± 0.3% of the Balance Chart value.

The RTOW data provided in the Performance Manual is calculated for a take-off CG of 53.5% Co. Use of 53.0% take-off CG is restricted to take-off weights less than 140,000 kg and the performance penalties given in the Performance Manual must be used.

Use of 54% take-off CG is limited to Take-off fuel quantities in excess of the maxima for 53.5% Take-off CG given in Table 5 of the Load & Balance Manual. There is a small improvement to RTOW weights - see Performance Manual.

IN-FLIGHT CG LIMITS
(Except for Take-off and Landing Phases)



(Unchanged)

AIRPLANE GENERAL

SPEED

Flight Envelope
('No Fault' Condition)

V_{RA} Rough Air Speed

Below 32,000 ft

Aircraft weight below 140,000 kg : V_{RA} MAX = 300 Kts

Aircraft weight above 140,000 kg : V_{RA} MAX = 375 Kts

Above 32,000 ft

At all aircraft weights: V_{RA} MAX = Sufficiently below V_{MO}/M_{MO} to avoid frequent overspeed warnings.

V_{RA} MIN = 250 Kts or V_{LA} whichever is greater.

V_{MO}/M_{MO} Maximum permissible airspeed and mach number : See Flight Envelope on 01.01.08.

NOTE: The limits shown on this figure are based on the output from ADC 1. When operating at M_{MO} conditions the mach number output from ADC 2 will be approximately 0.01 M higher than the output from ADC 1.

The machmeter M_{MO} pointers are not affected by this difference.

V_{LA} Lowest authorised speed : See Flight Envelope on 01.01.08

NOTE: Below 15,000 ft it is superseded by the appropriate scheduled performance speeds (V_2 or V_{REF}).

T_{MO} Total temperature limit : 127°C.

NOTE: Any exceedance of T_{MO} which results in a total temperature in excess of the Engine Limit of 130°C must be reported after flight.

Maximum Altitude : 60,000 ft.

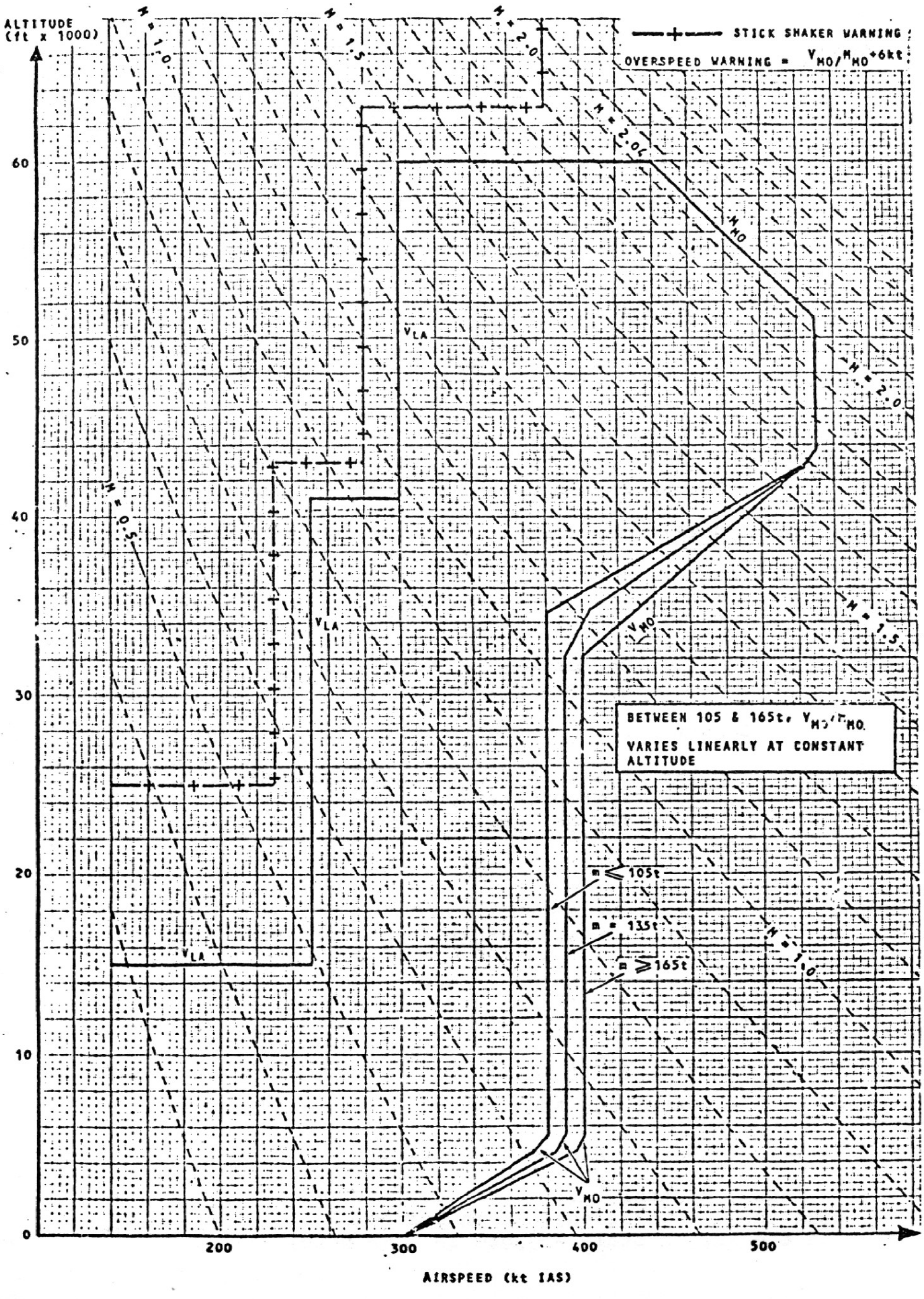
Maximum Incidence (ADC) : + 16.5° in quasi-static flight.

Minimum Pitch Attitude Above M = 1.0 : -5.5°

Maximum Mach No. in Subsonic Cruise:-

In manual control .... M = 0.93
With the autopilot engaged in ALT HOLD and the autothrottle engaged in MACH HOLD .... M = 0.95

FLIGHT ENVELOPE LIMITATIONS

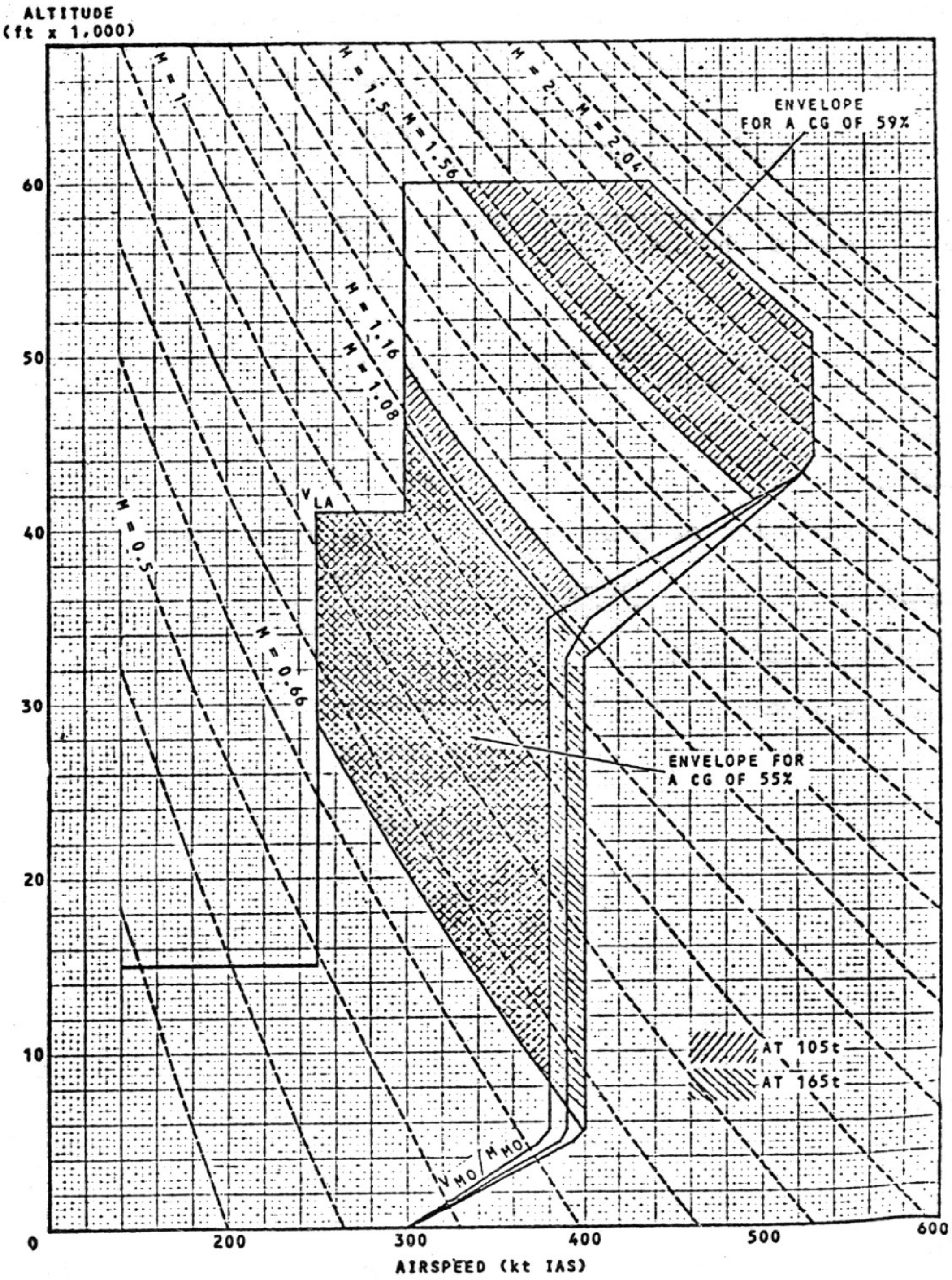


BETWEEN 105 & 165t, V_{MO}/M_{MO} VARIES LINEARLY AT CONSTANT ALTITUDE

AIRPLANE GENERAL

MACH/CG

Mach number limitations vary with CG position and, to a lesser extent with weight, (see pages 01.01.05 and 01.01.06).
For example, the envelopes associated with supersonic and subsonic cruise, at CG positions of 59% & 55% Co respectively, are shown on the following figure:-



(Unchanged)

Failure Cases

The limitations are given with the associated procedures.

Nose/Visor

Visor Down, or operating Nose 5° or operating between UP & 5°	325 kt/M = 0.8
Nose Down, or operating between 5° & DOWN	270 kt/20,000 ft
Nose and Visor up but unlocked	325 kt/M = 0.95

The nose must be in the 5° position for take-off

Below 250 kt the visor must be in the DOWN position with the nose at 5° or lower.

Nose and/or visor operation must not be made below 500 ft above the terrain.

Parking

To avoid the possibility of water being trapped in the manometric system, the aircraft must not be parked with the nose in the DOWN (12½°) position.

Landing Gear

Retraction, extension or down	270 kt/M = 0.7
Main Landing & Land/Taxi Lamps	270 kt
Windscreen Wiper Operation	325 kt
Side Vision Window	Not to be opened in flight

OPERATIONAL

Type of Operation

The aircraft is certificated in the Transport Category (Passenger).

Minimum Crew

Two Pilots and a Flight Engineer

Maximum Number of Occupants

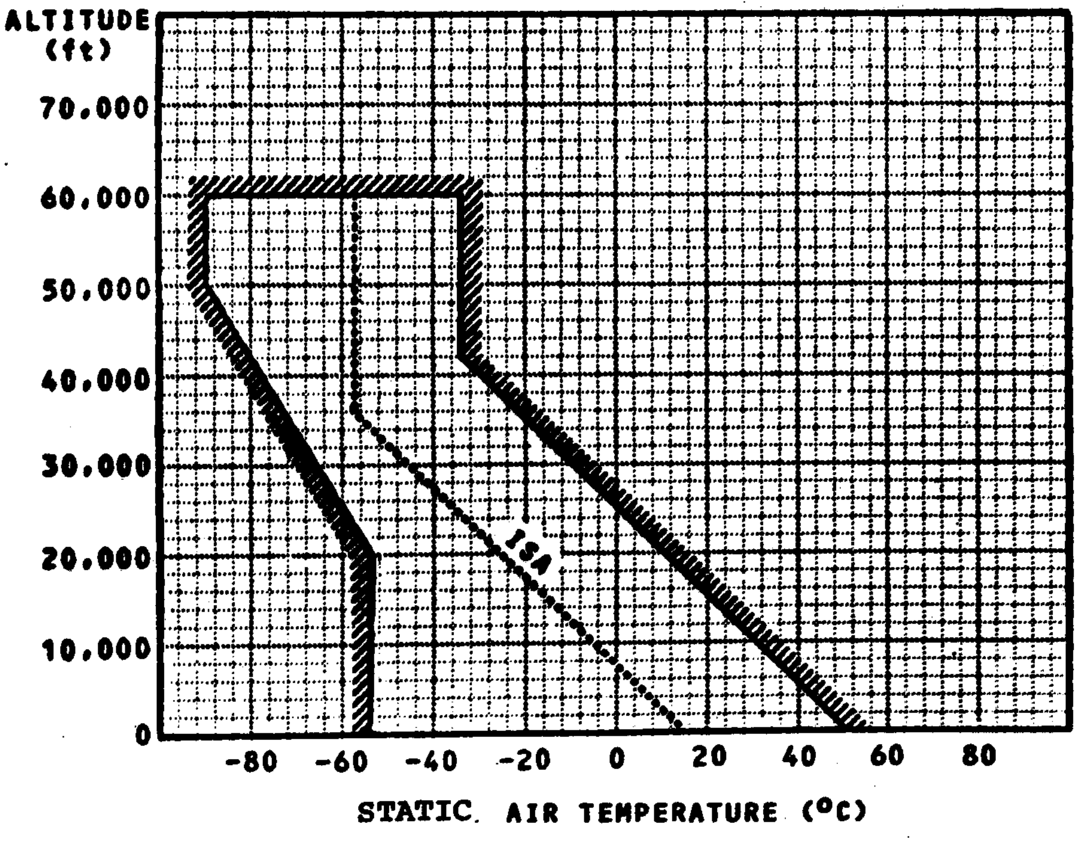
Not to exceed:	139
Maximum number of passengers:	128
Maximum number on the flight deck for take-off and landing:	5

The maximum number of occupants must not exceed the number of seats provided and approved for use during take-off and landing.

Children who are under the age of three years and who are carried in the arms of passengers may be left out of account for these purposes.

Altitude/Static Air Temperature Limits

The aircraft and its equipment are cleared to operate within the altitude/static air temperature limits shown below. It should be noted that more restrictive limitations are specified in 01.11 relating to the minimum oil and fuel temperatures for engine starting, relighting and running above Idle power.



(Unchanged)

AIRPLANE GENERAL

MISCELLANEOUS

Crew Seats

For take-off and landing the crew seats must be locked, and where power operated, with the power switched off. In addition the flight engineer's seat must be facing forward with the crash lock engaged and the seat indicator located within the white band painted on the scanning trolley.

Passenger Luggage Bins

To avoid influencing the local magnetic field near the flux valves, the presence of any metallic object, or object which might cause a magnetic disturbance, is prohibited in the passenger luggage bins labelled:- CREW USE ONLY
RESERVE A L'EQUIPAGE

Smoking

Smoking is permitted only in the passenger cabin (excluding the toilets) and the flight crew compartment.

Limits indicated by Instrument Colour Coding

The meaning of the colour code used on some instruments to indicate operating ranges and limits is as follows:-

Type & Colour of Marking	Meaning
Red line	Minimum & Maximum safe operating limits
Red Area	Prohibited range
Yellow Area	Precautionary range NOTE: The yellow areas on the EGT indicators have the following meaning : Narrow arc : precautionary range for take off and reheated climb rating Wide arc : precautionary range for the contingency rating
Green Area	Normal Operating range

(Compl ly Revise

MISÇELLANEOUS

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AIR CONDITIONING AND PRESSURIZATION

Rack Cooling and Air Generation

A conditioned air supply must be provided when the flight deck ambient temperature is greater than 25°C and electronic/electrical equipment is being operated for longer than 45 minutes without the appropriate master circuit breakers being tripped.

With two generation groups inoperative:-
Total temperature limit = 100°C T_T

With three generation groups inoperative:-
Mach No. limit : less than M = 1.0.

With four generation groups inoperative, or in unpressurized flight:-
The cabin altitude must not be allowed to exceed 15,000 ft.

Cabin Differential Pressure

Maximum in flight	: 11.7 psi
Normal Operating maximum	: 10.7 psi

I.N.S. Ground Running Limitations

Maximum running time with forward rack cooling fans inoperative is 2 minutes.

Automatic Flight Control

The autopilot approach modes must not be used unless autothrottle is engaged.

The flight director approach modes must not be used unless autothrottle is engaged.

In approach using the autopilot and/or flight director in the LAND mode the approach speed must be stabilized by 700 feet.

When an autopilot, or flight director, is engaged in the MAX CRUISE mode it is not permitted to engage the autothrottle associated with the non-engaged autopilot, or flight director, i.e. the following combinations are prohibited:-

AP 1/AT 2 and AP 2/AT 1
FD 1/AT 2 and FD 2/AT 1

Autopilot

(1) After take-off the following autopilot engagement limitations must be observed:-

- (a) It must not be engaged below a height of 500 ft above the ground.
- (b) If a noise abatement procedure is followed:-
  - (i) It must not be engaged before power has been reduced to the noise abatement setting.
  - (ii) It may be engaged during the noise abatement procedure only when the aeroplane is stabilised at the noise abatement speed.

(2) The aeroplane must not descend below a height of 1,000 ft above the ground with the autopilot engaged unless it is coupled to an ILS, or the autopilot is engaged in the INS and VERT SPEED modes and all the following conditions are observed:-

- (a) The controlling autopilot is receiving data from an INS which had its position data updated shortly before the descent from 1,000 ft.
- (b) The selected vertical speed is less than 1,000 ft/min rate of descent.
- (c) The pitch attitude is never less than 5° nose up.
- (d) Visual contact with the ground is established at not less than 800 ft above the ground.
- (e) The autopilot does not remain engaged below a height of 500 ft above the ground.

(Unchanged)

(3) The GO-AROUND mode must not remain engaged above a height of 1,000 ft above the ground.

(4) An automatic approach may be made in GLIDE mode provided that:-

- (a) The decision height is not less that 200 ft.
- (b) The autopilot does not remain engaged below a height of 100 ft

AUTOMATIC FLIGHT

(5) An automatic approach and landing may be made in LAND mode provided that:-

(a) The reported headwind component is not more than 25 kt, the crosswind component is not more than 15 kt, the tailwind component is not more than 10 kt and the level of turbulence is not more than is normally associated with the wind speed.

(b) The nominal glide path angle is not less than 2.5° or more than 3.1°.

(c) The ILS beam is established to be suitable for automatic landing.

(d) The LAND button on the autopilot controller is illuminated at 700 ft.

(6) A category 2 ILS approach and landing may be made provided that the following limitations are observed:-

(a) The decision height must not be less than 100 ft.

(b) The autopilot must be used in LAND mode, (single or dual), and the limitations given in (5) above for the use of this mode must be observed.

(c) The runway has ICAO Category 2 localizer and glide path transmitters which are reported to be operating within Category 2 limitations, (See NOTE).

NOTE

Some monitor failures in the ground ILS would permit the radiation of erroneous signals if followed by a transmitter malfunction. There is no provision in the aeroplane for recognising such a condition. Category 2 operations can only take place with safety using ground stations whose maintenance procedures and design are such that the monitoring of the transmitted signal is reliable.

A Category 3 ILS approach and landing may be made provided that the following limitations are observed:-

(a) The decision height must be 15 ft. (radio height).

(b) The autopilot must be used in LAND mode and the limitations given in (5) above for the use of this mode must be observed.

(c) LAND 3 must be shown on the Warning and Landing Display at 300 ft. (radio height).

(d) The aerodrome must be reported to be operating in accordance with the requirements for Category 3 operation.

(e) The Obstruction Free Zone must be free of obstacles up to the Category 2 decision height.

(Deletion)

(f) The touch-down RVR value must be reported to be not less than 250 metres, and the mid-point RVR not less than 150 metres.

Flight Director

(1) The flight directors must not be engaged after take-off below a height of 500 ft above the ground.

(2) The aeroplane must not descend below a height of 1,000 ft. above the ground with a flight director engaged unless it is coupled to an ILS.

(3) The Flight Manual states that when the flight directors are used as the primary means of guidance in GLIDE or LAND modes, the decision height must not be less than 200 ft. However it is Flight policy not to use the flight director as the primary means of guidance in the LAND mode.

(4) The flight directors must not be used on the approach below a height of 160 feet above the ground, but may remain engaged.

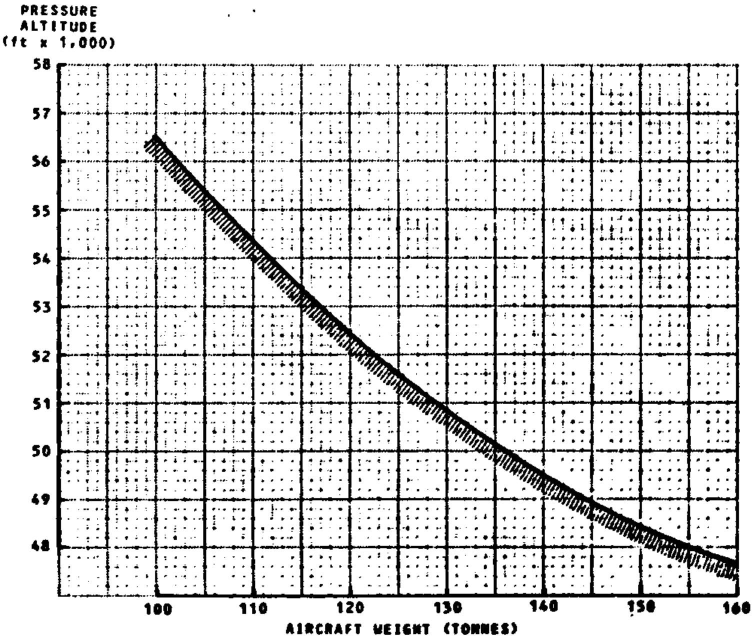
contd

Autothrottle

(1) The autothrottle must not be used in any of the following 3 conditions:-

- (a) In IAS HOLD mode below a speed of 185 kt.
- (b) With 2 engines inoperative.
- (c) During supersonic cruise below the altitudes shown in the following figure:-

MINIMUM SUPERSONIC CRUISE ALTITUDE



NOTE:

The limit shown is valid for ambient temperatures of ISA + 4° C and below.

For ambient temperatures above ISA + 4° C the limiting altitude is reduced, from that shown, by 1,000 ft for each 2°C that the ambient temperature is above ISA + 4°C.

(2) The autothrottle must be disengaged at not less than 40 ft during an approach in manual control.

FIRST ISSUE

ELECTRICAL

Main Generators

Maximum continuous load per generator	54 kW or 36 kVAR
Maximum overload per generator (5 min limit)	80 kW or 60 kVAR
Maximum system load sharing between parallel generators	6 kW or 4 kVAR

Emergency Generator

Maximum load	30 kVA (25 kW)

Transformer Rectifier Units:

Maximum current per TRU	150 amp
Maximum overload per TRU (5 min limit)	200 amp

Constant Speed Drive

Oil Inlet Temperature	
Continuous Maximum	145°C
1 hour Limit	145°C to 155°C
5 minute Limit	Above 155°C
Maximum Oil Temperature Difference	20°C up to 30 kW 30°C above 30 kW

Split System Breaker (SSB)

If it is desired to open the SSB when only 3 main generators are on line, the Emergency Generator must be selected to Manual and left running for the remainder of the flight.

If the Emergency Generator voltage and frequency are outside the limits 110-118V and 390-410 Hz the SSB MUST NOT be opened except as part of the crew procedure to re-instate the generator system following malfunction or failure, (including the "Electrical Smoke or Fire" drill).

Batteries

Maximum initial charge rate is 100 amp

Maximum charge rate per battery, after 20 min, is 20 amp

Manual Paralleling

Manual Paralleling must not be attempted if there is a difference of more than 6HZ across the BTB.

FLIGHT CONTROLS

PITCH CONTROL FORCES

During turns at V_{REF}, pitch control forces must not be trimmed out.

BLUE OR GREEN SYSTEM SPOOL VALVE JAM

IF $M \leq 0.93$

Replan for subsonic flight maximum speed of M : 0.93.

IF $M > 0.93$

Reduce speed to 350 kt at constant altitude, then descend to FL 310 at speed 350 kt.
Replan for subsonic flight M : 0.93.

FLIGHT CONTROL POSITION INDICATOR WARNING

CONTROL SURFACES IN M MODE	MAX AFT CG	LANDING SPEED	M MAX
RUDDER			1.97
MID. OUTER or INNER or ALL ELEVONS	$M < 1$ 55% $M > 1$ 58.5%	MINIMUM V_{REF} +10 kt	1.97
If all surfaces are in M mode, before transonic acceleration, remain subsonic.			

INVERTER FAILURE WARNING

FLIGHT PHASE	M MAX	MAX AFT CG	V for Landing
BEFORE TRANS ACCEL	0.93	55%	V_{REF} + 10 kt
AFTER TRANS ACCEL	1.97	58.5%	

FLIGHT CONTROLS

LOSS OF TWO ARTIFICIAL FEEL SYSTEMS

Control forces are reduced, fly the aircraft with care.

IF PITCH AXIS IS LOST

In subsonic cruise, limit the AFT CG to 55%.

IF YAW AXIS IS LOST

Avoid using the rudder pedals in subsonic flight above 250 kt.

EMERGENCY FLIGHT CONTROL

The Emergency Flight Control System is to be used only in those cases of jamming where force on the control column/wheel produces, in the particular axis, no movement of the column/wheel in the direction demanded.

FUEL SYSTEM

Fuel Loading

The refuelling of the aircraft is carried out to schedules which specify the fuel distribution according to the total fuel load and specific gravity.

When refuelling, the fuel must be distributed in accordance with these instructions.

Refuelling with Passengers on Board

Passengers must not be on board the aircraft when it is being refuelled with fuel which does not contain Shell ASA-3.

This limitation does not apply when "topping-up" Tank 11 to achieve the required fuel load.

Minimum Fuel Load for Go-around/Baulked Landing

A Go-around or baulked landing must not be attempted unless the collector tank total contents are greater than 2,500 kg. The total must be divided approximately equal between the four tanks.

A baulked landing with 2 engines inoperative must not be attempted if the fuel quantity in each collector tank supplying operating engines is less than 1,250 kg.

FUEL SYSTEM

Approved Fuels and Additives

Fuels

(1) Unlimited Use

Kerosine type, (AVTUR), fuels to the following specifications:-

D. Eng R.D. 2494 Iss.7 Amd. 1
AIR 3405/C Iss.4
ASTM D 1655-73 Jet A-1
3-GP-23 h
D. Eng R.D. 2453 Iss.3 Amd. 1

NOTE

Fuel specification D. Eng R.D. 2453 already includes Hitec E.515 and anti-icing additive to specification D. Eng R.D. 2451 Iss.2 The limitation on the use of this fuel is as specified subsequently in paragraph B (2) for all fuels containing Hitec E.515.

(2) Limited Use

The following fuels may be used on a non-routine basis when no fuels in the "unlimited use" category are available:-

ASTM ES2-74 Jet A-1

and, provided that the operational conditions are such that the fuel temperature will at no time, fall below -40°C:-

ASTM ES2-74 Jet A

Where the -40°C limitation specified above can be observed the following fuel may be used on a routine basis:-

ASTM D 1655-73 Jet A.

For use of Jet B, Wide-cut JP4 type of fuel, see Conditional Procedure entitled, "Use of JP4 type fuel".

Additives

(1) Icing Inhibitor

D. Eng R.D. 2451 Iss.2
AIR/3652/A
MIL - I - 27686 E.

The maximum permitted concentration of the additive is 0.15% by volume.

If any fuel heater is inoperative, use of fuel containing an approved icing inhibitor, at a concentration of not less than 0.1% by volume, is mandatory.

(2) Corrosion Inhibitor

Hitec E.515 in concentrations not exceeding 21 mg/litre, (7.5 lb per 35,000 Imperial gallons).

TOLAD 245 in concentrations not exceeding 34 mg/litre, (12 lb per 35,000 Imperial gallons).

(3) Static Dissipator

In order to achieve a refuelling time of 20 minutes from normal reserve quantities to full tanks, Shell ASA-3 static dissipator must be present in the fuel at concentrations up to a maximum of 1.0 mg/litre, (0.35 lb per 35,000 Imperial gallons).

If ASA-3 is added to the fuel, concentrations may only be used which result in the electrical conductivity of the fuel remaining within the specification limits.

If fuel is used which does not have an appropriate concentration of static dissipator, the restrictions on refuelling rate must be observed. These are given in section 1-1 page 2 of the Refuelling Book.

(4) Combined Additives

AL 38

This is a combination of 99 parts by weight of fuel system icing inhibitor and 1 part by weight of Hitec E.515. The maximum permitted concentration is 0.13% by volume, provided that the fuel does not already contain either of the constituent additives, The use of AL.38 is subject to the limitations specified for Hitec E.515.

(5) Fuel Dye

Automate Yellow 662 or 662F

The maximum permitted concentration is 120 ppm by weight, (42 lb per 35,000 Imperial gallons).

(6) Anti-Microbial Additive

Biobar JF, in concentrations not exceeding 270 ppm and with a total boron content not exceeding 20 ppm, may be used on an intermittant basis. It is permitted to burn off the treated fuel provided that the fuel is not contaminated by microbiological or other debris.

FUEL SYSTEM (OILS)

Approved Oils

The following oils, to D. Eng R.D. 2497, are approved for use in the main engine, air starter and nozzle trim unit:-

BP ENERJET 523
Esso ETO 25
Shell ASTO 555
Mobil RM 193A-3

The only oils currently approved for use in the Integrated Drive Generator are:-

Esso ETO 25
Esso ENCO 2380

Different Oils must not be mixed in the same unit.

HYDRAULIC POWER

Engine Driven Pump Dry Running

When an engine driven pump has run for more than 30 minutes with the associated hydraulic Shut-Off Valve Shut, it must not be re-activated.

Hydraulic Auxiliary Compresser

Two operating cycles followed by a 10 minute cooling period.

LANDING GEAR

Landing Gear

Retraction, extension or down 270 kt/m = 0.7

Brakes

Take-off must not be commenced if any brake overheat warning light is illuminated.
Take-off is prohibited if any Anti-Skid 'R'light comes on during gentle braking above 10 kt, or is permanently on during the initial take-off roll.

> The take-off prohibition, when any 'R' light is permanently on, does not apply when the aircraft is being operated in accordance with the MEL concession which allows dispatch with a confirmed indication system fault, which results in one of the 'R' lights being permanently on.

The wheelbrakes must not be released at engine powers above Idle, when the aircraft is stationary.
When using the emergency braking system, (brake control lever in the EMERG position), the brake pressure must be limited, except in the case of an emergency, to a maximum of 900 psi when taxiing.
Except in the case of an emergency, or a failure condition where the drill requires such action, the brake control lever must not be moved to the PARK position unless the aircraft is at a complete standstill.
When the brake control lever is in the PARK position the engines must not be operated above 82% N_2 except under the following conditions:-

> Any one engine may be run at up to maximum take-off power with reheat, provided that the other engines are not above Idle power.

Gear O/Ride

Under certain failure conditions it is possible that damage could occur if the normal landing gear selector baulk is overriden. Because of this the O/RIDE button must only be used if it is vital for the safety of the flight, (e.g. obstacle clearance in the event of engine failure(s)).

Taxiing

When taxiing at weights above 176,900 kgs.

1. Sharp turns above 40 kt must be avoided.
2. Full rudder pedal travel may be applied only below 40 kt.
3. The nosewheel steering tiller may be used only below 15 kt.

NOTE: The limitations are given in terms of speeds indicated by the INS at the start of the manoeuvre.

NAVIGATION SYSTEMS

INS Alignment

Maximum latitude for alignment .... 76°.
The aircraft must not be moved while the INS is in the ALIGN mode.

ADC Comparator Failure

The maximum operating speeds V_{MO}/M_{MO} must be reduced by 10 kt and by 0.05 mach respectively, when the ADC comparator is not functioning.

NOSE AND VISOR

Nose/Visor

Visor Down, or operating Nose 5° or operating between UP & 5°	325 kt/M = 0.8
Nose Down, or operating between 5° & DOWN	270 kt/20,000 ft
Nose and Visor up but unlocked	325 kt/M = 0.95

The nose must be in the 5° position for take-off

Below 250 kt the visor must be in the DOWN position with the nose at 5° or lower.

Nose and/or visor operation must not be made below 500 ft above the terrain.

Parking

To avoid the possibility of water being trapped in the manometric system, the aircraft must not be parked with the nose in the DOWN (12½°) position.

ENGINE

Introduction

In forward thrust the maximum permitted value of N_2 is a function of the engine rating being used as shown on the flight deck placard. Also, in forward thrust, the maximum permitted value of EGT depends on the engine rating being used and on the total temperature. The limiting value for any particular condition can be determined by reference to the figure on page 01.11.03.

In reverse thrust the maximum permitted value of N_2 depends on the total temperature.

Placarded Limitations

The principal engine limitations are placarded on the flight deck. For convenience of presentation, and to ensure consistency, the limitations for these parameters are covered by the figure below depicting the flight deck placard.

OLYMPUS 593 MK.610-14-28 LIMITATIONS						
CONDITIONS		% RPM		EGT °C	TIME LIMIT	OIL TEMP.FOR TAKE-OFF:125°C MAX
		N_2	N_1			
CONTINGENCY		106.8	102.0	833 *	2½ MINS	FRONT VIBRATION MAX.CONTINUOUS: 5"/SEC
TAKE-OFF		106.0	102.0	803 *	5 MINS	
REHEATED CLIMB		105.6	102.0	772 *	15 MINS	
MAX.CONTIN(CLB/CRS)		105.3	102.0	736 *	NO LIMIT	
IDLING MINIMUM		60.0	-	-	NO LIMIT	NOTE: EGT & N_2 VALUES MARKED * VARY WITH TOTAL TEMP & ARE THE HIGHEST POSSIBLE. FOR EGT VARIATION WITH TOTAL TEMP. SEE PAGE 03 OF THIS SECTION.
REVERSE	FLIGHT	IDLE	-	-	4 MINS	
	GRD.IDLE	IDLE	-	-	45 SECS TOTAL	
	GRD.MAX	98.0*	-	-	30 SECS AT MAX	
START & RELIGHT		-	-	550	2 SECS	
AUTO DE-BOW		32.0	-	-	3 MINS	

Oil, Fuel, TCA, Air Turbine Starter and Throttle Limitations (non-placarded)

NOTE: CSD Oil temperature limitations are given on page 01.04.01.

Oil Pressure

(1) The normal operating oil pressure range is 18 to 30 psi.

(Deletion)

(2) The minimum oil pressure acceptable for flight = 18 psi with the GRD IDLE switch set at LO.

(3) The minimum oil pressure for continued engine operations = 15 psi.

Continued

TEMPORARY REVISION
Insert facing 01.11 page 01

REASON FOR ISSUE:

Incorporation of Olympus modification 8562 in order to reduce engine oil consumption due to internal leakage.

The modification lowers the operating pressure by introduction of a restrictor in an external feed pipe and resets the low pressure switch datum to 7 psi.

ACTION:

When Olympus modification 8562 is incorporated the following engine oil pressure limitations must be observed:-

(1) The normal operating oil pressure range is 10 to 20 psi.

(2) The minimum oil pressure acceptable for take-off is 10 psi with the Ground Idle switches at Low.

(3) The minimum oil pressure for continued engine operation is 7 psi.

Engines with the modification incorporated can be identified by an entry in Notes to Crew and Maintenance Engineers and by placarding of the oil pressure gauge.

POWER PLANT (continued)

Oil Temperature

(1) Minimum oil temperature for motoring cycle = -40°C.

(2) Minimum oil temperature for starting and relighting = -35°C.

(3) Minimum oil temperature before advancing the throttle above idle = -20°C

(4) Maximum continuous oil temperature = 190°C.

(5) Absolute maximum oil temperature = 195°C.

NOTE: 5 minutes operation is permitted in the range 190°C to 195°C.

Oil Contents

(1) Minimum oil contents for starting = 6.5 US QTS.

(2) Maximum oil contents = 14.0 US QTS. Exceedance of the maximum oil contents must be reported after flight.

NOTE: The characteristics of the oil system are such that with a satisfactory system the contents indicator warning light may be on prior to engine start, however it should always be out at Idle.

(3) Maximum permitted oil comsumption = 2.4 US QTS/Hr.

Fuel Temperature (As indicated on the Powerplant Management panel)

(1) Minimum fuel temperature for starting and relighting = -40°C

(2) Minimum fuel temperature before advancing the throttle above idle = 20°C.

(3) Maximum continuous fuel temperature = 150°C.

(4) Absolute maximum fuel temperature = 170°C.

NOTE: 2 minutes operation is permitted in the range 150°C to 170°C.

(Unchanged)

Turbine Cooling Air Temperature

(1) Maximum permitted = 640°C.

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POWER PLANT (continued)

Air Turbine Starter

(1) Maximum air turbine starter supply pressure is 35 psi.

(2) Maximum number of consecutive air turbine start operations is two.

(3) Minimum time between groups of two air turbines start operations (for starter cooling):-

Using airstart truck - 10 min
Using crossbleeding from adjacent engine - 30 min

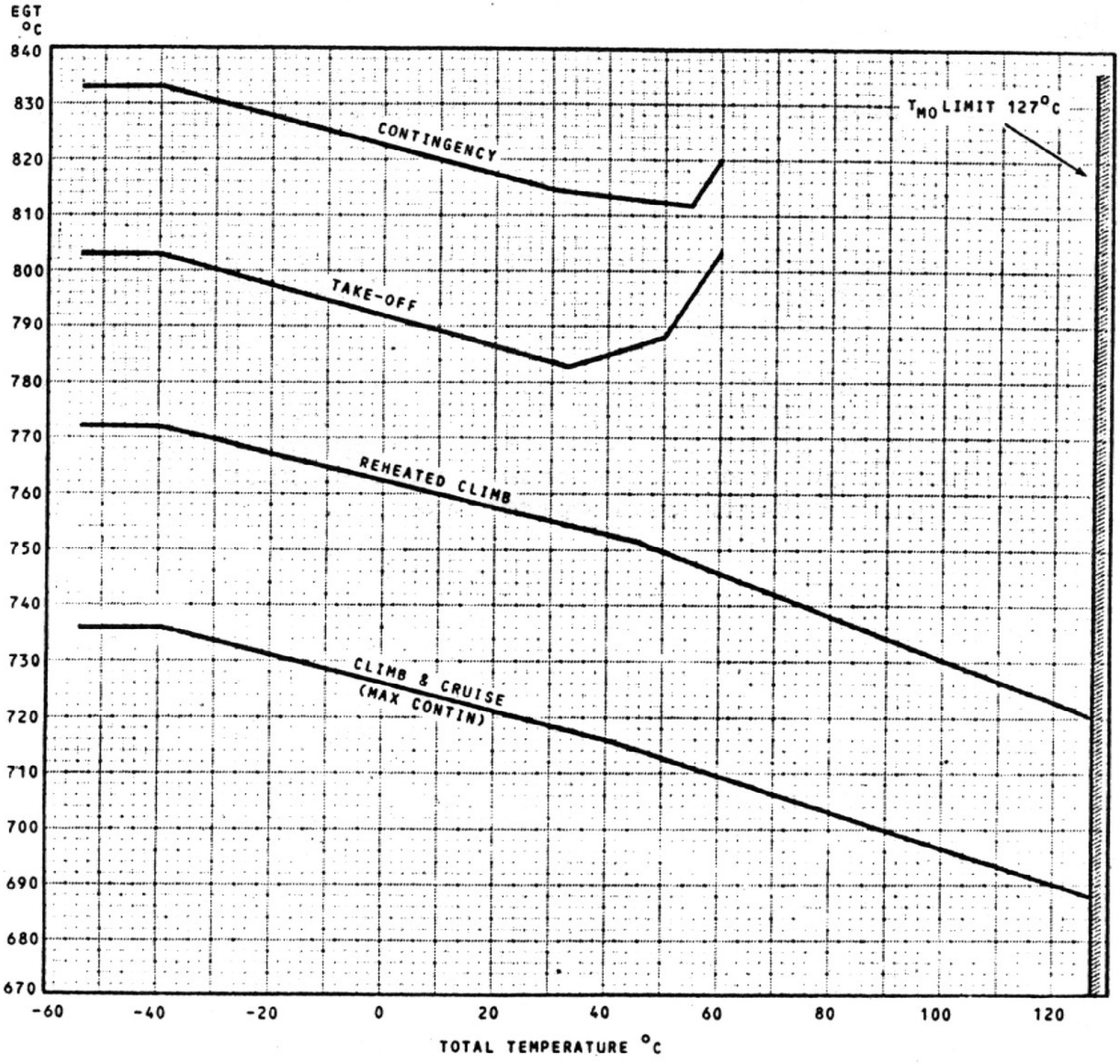
(4) The maximum duration of air turbine starter operation is 30 sec.

Throttle Lever

(1) The throttle lever must not be moved until the engine has run at idle for a minimum time of one minute.

EGT Limitations

The following graph gives the maximum values to which the engine must be manually limited, if necessary.



Ground Starting

Engine starting is not permitted with a tailwind component greater than 20 kt.

If more than 10 minutes and less than 5 hours have elapsed since the engine was last operated, it must be run at the debow condition for not less than 1 minute.

Following a false start on the ground, a 20 second dry motoring cycle is required before attempting another start. The aircraft pitch attitude during the dry motoring cycle and the subsequent start must not exceed 1° nose down as indicated on the ADI.

Restricted Speed Bands

Starting

The maximum stabilised debow speed is 32% N_2. An overshoot above this speed during attainment of the debow condition is permitted, provided that its duration does not exceed approximately 5 seconds.

Idle

Steady running at idle or between idle and rotating stall clearance speed is permitted only if rotating stall has been cleared.

Ground Running

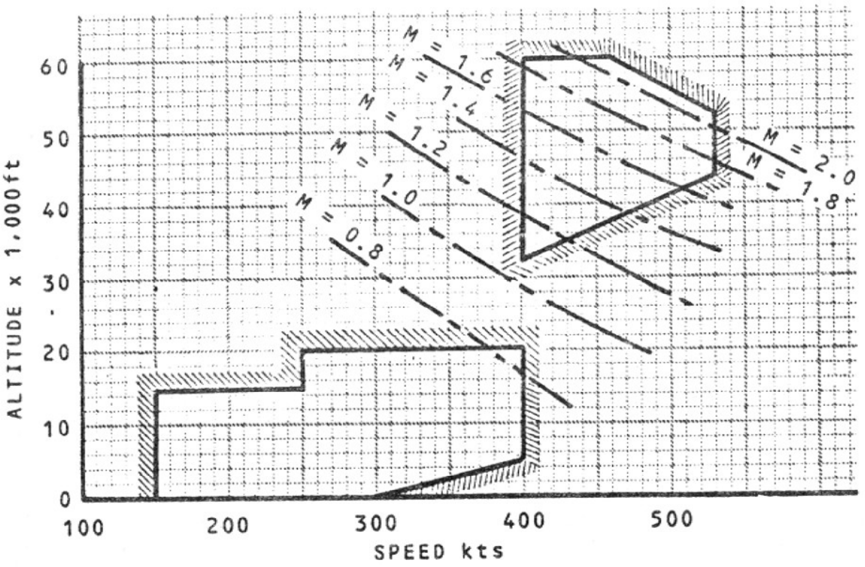
Ground running in the range of 88-93% N_1 must be limited to transient excursions. Ground running above this range must be kept to the minimum possible.

Engine No.4 must not be operated above 90% N_2 for more than 30 seconds with the ENG 4 T/O N_1 LIMITER switch set to 88%. If it is necessary to carry out more than one operation above 90% N_2, a cooling period of not less than 5 minutes must elapse with the engine at Idle between such operations.

POWER PLANT (continued)

Relight Envelope

Relights may be attempted outside the envelope shown below, although these may not be successful.



RELIGHT ENVELOPE

(NOTE: RELIGHTS MAY BE ATTEMPTED OUTSIDE THE ENVELOPE BUT MAY NOT BE SUCCESSFUL)

Ground Running in Icing Conditions

Engine anti-icing must be ON for ground running and take-off when the ambient temperature is below + $3^{\circ}C$ and the visibility is less than 1000 metres.

The engines must not be run at the debow condition for more than 1 minute if the ambient temperature is below + $3^{\circ}C$ and the visibility is less than 1,000 metres.

Engine Overspeed

Unchanged

In the event of an overspeed above the maximum operating limits for the rating selected, continued engine operation is dependent upon the severity and duration of the overspeed, as defined below.

(1) N_2% rpm

A maximum of 20 seconds is permitted within the range maximum operating to 110%. If the time limit of 20 seconds is exceeded or N_2 exceeds 110%, the Precautionary Engine Shut Down procedure must be applied.

(2) N_1% rpm

A maximum of 20 seconds is permitted within the range maximum operating to 108.5%. If the time limit of 20 seconds is exceeded or N_1 exceeds 108.5%, the Precautionary Engine Shut Down procedure must be applied.

Engine Control Schedules

Schedule	Indication	Limitation
E Flyover	F/O (White)	Minimum Speed: 220 kt Maximum Mach No: 1.0 M
E High	HI (White)	Minimum Speed: 220 kt
E Mid	MID (White)	For use in flight only
E Low	LO (Green)	No Limitation

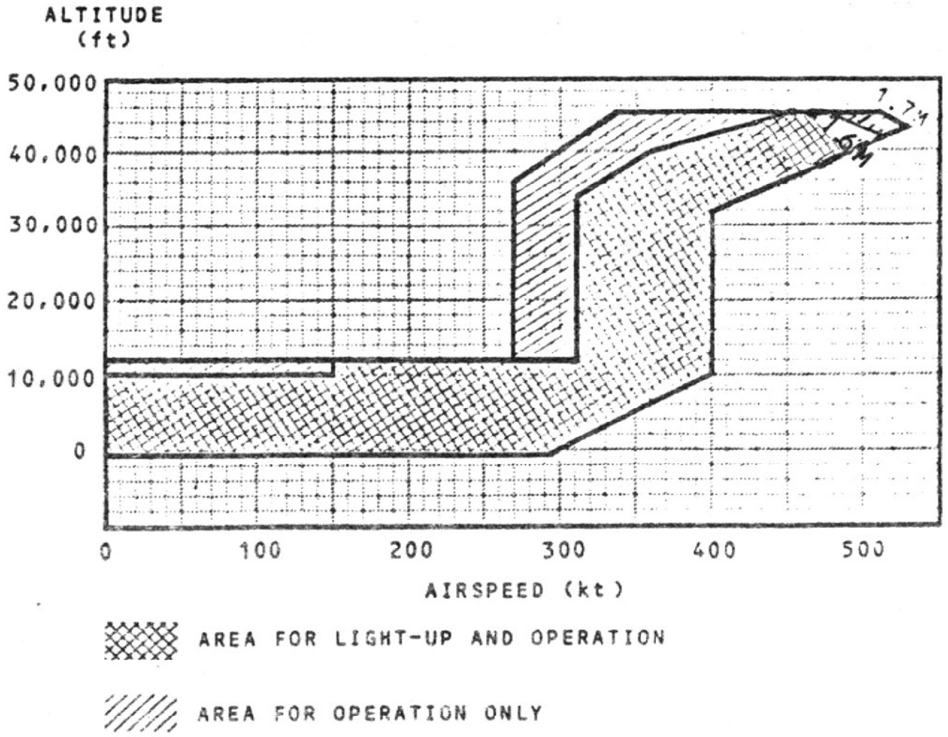
Use of Reheat

Reheat is not normally required for a baulked landing or go-around When 3 or 4 engines are operating it must not be used for these or similar manoeuvres unless the collector tanks are above "Underfull".

NOTE: Minimum permitted collector tank contents for a baulked landing or go-around are given on page 01.01.12.

Reheat should not be used for longer than 15 min per flight, during use of "Engine Flight Rating".

Reheat must not be used outside the envelope shown below.



CONCORDE FLYING MANUAL

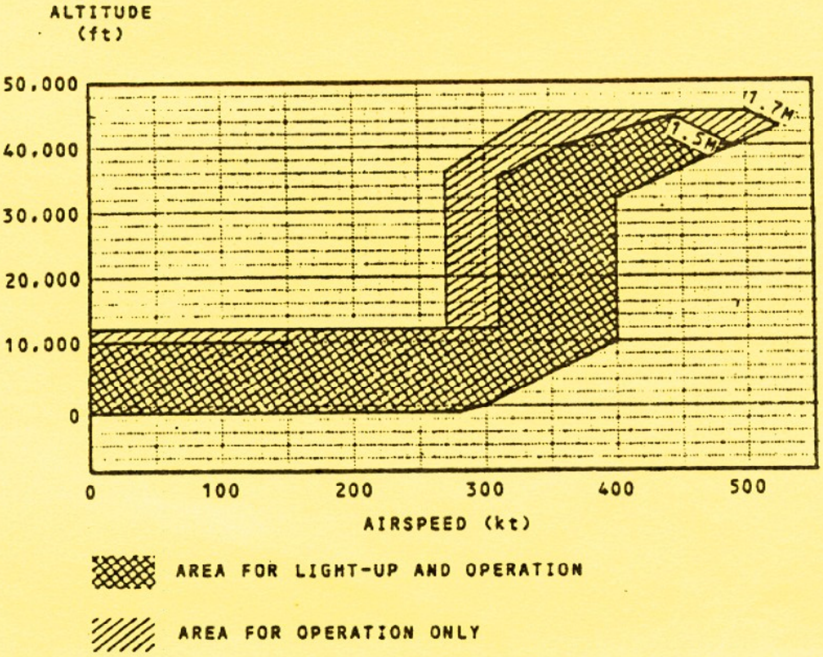
19 MAY 78

TEMPORARY REVISION
Insert facing 01.11 page 06

REASON FOR ISSUE:

To raise the upper limit of the reheat operating envelope to 45,500 ft

When the aircraft is being operated to a reduced limit speed of 500 kt, the reheat envelope shown opposite is replaced by the following:-



TEMPORARY REVISION
Insert facing 01.11 page 07

REASON FOR ISSUE:

To clarify that the existing forward thrust limitation applies only when ground running.

ACTION:

Ignore the existing para 'Forward Thrust' at the top of the page and in its place read:

Forward Thrust

When ground running, the engines must not be operated continuously above 93% N_1 for more than 3 minutes. A cooling period of at least 5 minutes must elapse with the throttle levers at Idle before a second operation above 93% N_1. The cooling period between subsequent operations above 93% N_1 must be increased to a minimum of 13 minutes.

NACELLE

Forward Thrust

When ground running, the engines must not be operated continuously above 93% N_1 for more than 1½ minutes. A cooling period of at least 1 minute must elapse with the throttle levers at Idle before each of the next two operations above 93% N_1. After three such operations a cooling period of at least 5 minutes must elapse with the throttle levers at Idle, before a further operation above 93% N_1, is carried out. After this operation, the engine must be either shut down or run at Idle for 13 minutes before the complete sequence of events can again be started.

Reverse Thrust

GROUND

(1) Successive Reverse Thrust Selections

To ensure adequate cooling the following minimum periods in forward thrust must be observed between selections of reverse thrust:-

Reverse Thrust Level	Subsequent Period in Forward Thrust
$N_2 < 80\%$	2 min
$N_2 \geqslant 80\%$	5 min

(2) Landing

In normal use, the reduction in reverse thrust power to idle must be made on two symmetrical engines at 100 kt and on the other two engines at 75 kt. Reverse thrust should be cancelled at about 40 kts.

When landing with one engine inoperative, the reduction in reverse thrust power to idle on the asymmetric engine must be made at 100 kt and on the other two engines at 75 kt. Reverse thrust should be cancelled at about 40 kts.

NOTE:

See NOTE overleaf

(3) Accelerate - Stop

The reduction in reverse thrust power to idle must be made on two symmetrical engines at 100 kt and on the other two engines at 75 kt. Reverse thrust should be cancelled at about 40 kt.

With one engine inoperative the reduction in reverse thrust power to idle must be made on the asymmetric engine at 100 kt and on the other two engines at 75 kt. Reverse thrust should be cancelled at about 40 kt.

NOTE:

See NOTE overleaf

NOTE:

1. The speeds quoted in paragraphs (2) and (3) overleaf have been selected to avoid re-ingestion problems.
2. On a slippery runway Reverse Idle may be maintained until the aircraft has stopped,

(4) Use of ARM Button

The FLIGHT REV ARM button must not be used during reverse thrust operation on the ground.

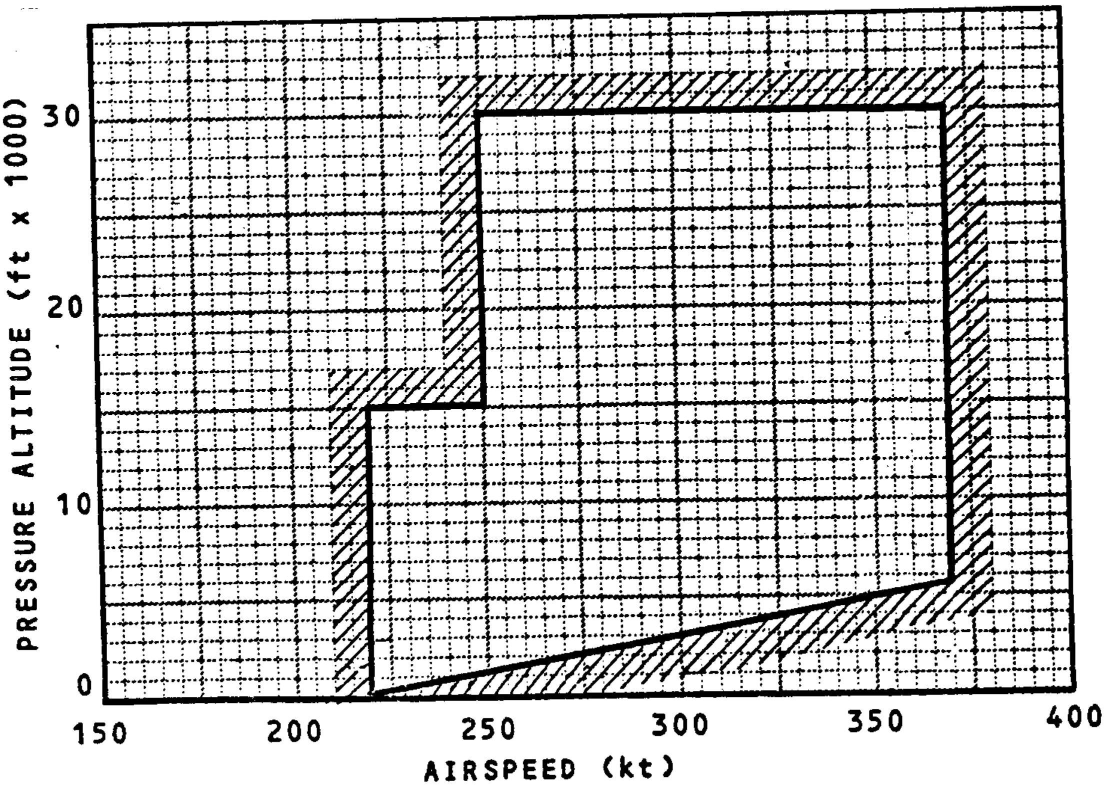
(5) Maximum Altitude

Thrust reverse operation on the ground is limited to a maximum airfield altitude of 8,500 ft.

FLIGHT

Use of reverse thrust in flight is permitted within the envelope shown below subject to the following conditions:-

1. Use limited to application of reverse idle power on either or both inner engines only.
2. Maximum period of use, 4 minutes.
3. It must not be used when the terrain clearance is less than 3,000 ft.



(Unc ged)

INTAKE AND SECONDARY NOZZLE

Secondary Air Doors

The maximum permitted speed with the doors shut is M = 0.95. The doors must be in the SHUT position before take-off.

Secondary Nozzle

If during transonic acceleration the secondary nozzle position is greater than 15°, the use of reheat on the associated engine is prohibited.

EMERGENCY PROCEDURES - CONTENTS

POWER PLANT

Engine fire (overheat or severe damage) 02.01.01
Four engine flame out above M = 1.2 02.01.05
Four engine flame out below M = 1.2 02.01.11

FLIGHT CONTROLS

Servo control spool valve jam 02.03.01
Control column jam in pitch or roll 02.03.02

HYDRAULIC POWER

Low hydraulic pressure at flying controls 02.04.01

NAVIGATION SYSTEM

Discrepancy between ADC 1 and ADC 2 02.05.01
Loss of a second ADC 02.05.03

ELECTRICAL

Failure of four main generators 02.06.01
Failure of three main generators 02.06.08

LANDING GEAR

Landing with abnormal landing gear configuration 02.07.01

AIR CONDITIONING

Rapid depressurization 02.10.01
Emergency descent 02.10.02

FIRE PROTECTION

Smoke on the Flight Deck 02.13.01
Smoke Warning (not expanded)
Freight Hold Fire (not expanded)
Air Conditioning Smoke 02.13.02
Cabin Fire (not expanded)
Electrical Smoke or Fire 02.13.03

MISCELLANEOUS

Emergency landing - Flight crew 02.14.01
Passenger Evacuation on Landing 02.14.04
Ditching - Flight crew 02.14.06
GPWS Pull-Up Warning 02.14.10
Crash Landing - Cabin Crew 02.14.51
Ditching - Cabin Crew 02.14.61

ENGINE FIRE (OVERHEAT OR SEVERE DAMAGE)

NOTE

Judgement and precision are as important as speed when putting out an engine fire. Actuating a wrong control could cause more trouble than a few seconds delay in taking the correct action.

AUDIO .... CANCEL E

Press and release the AUDIO CANCEL push button to cancel the engine fire warning audio (bell).

ENGINE SHUT DOWN HANDLE .... PULL E

All operations of the engine shut down handle must be recorded.

Pulling the engine shut down handle, when its lights (red) are flashing, dims the lights or, when the lights are steady. cancels the lights and:-
-Shuts the HP VALVE
-Switches the HP VALVE switch light (white) on
-Shuts the LP VALVE
-Shuts the hydraulic SHUT OFF VALVE(S)
-Shuts the air BLEED VALVE
-Shuts the air CROSS BLEED valves.
-Shuts the cabin inlet safety valve
-Shuts the SECONDARY AIR DOORS and engine bay vents, thus causing the FIRE FLAPS light (green) to come on.
-Onloads the standby (yellow) hydraulic system pumps
-Opens the ENGINE RECIRCULATION VALVE
-Inhibits the engine ignitors
-Inhibits the T1 ENGINE PROBE HEATER, thus causing the T1 light (yellow) to come on
-Shuts the reheat fuel shut off valve

As the engine RPM decreases the intake ramps are automatically lowered and the spill door is opened to match the intake air supply to the reduced engine demand.

(Deletion)

POWER PLANT

As the engine is shut down it will cause the following warnings:-

-Engine inlet LOW PRESS light (amber) on accompanied by a master warning system FUEL light (amber) on and audio (gong).

-Hydraulic LOW PRESS light(s) (amber) on accompanied by a master warning HYD light (amber) on and audio (gong).

-GEN light (amber) on, accompanied by a master warning ELECT light (amber) on and audio (gong) when aircraft speed is less than M = 1.10.

-The N1 SIG light (amber) may come on accompanied by a master warning INT light (amber) and audio (gong) when aircraft speed is subsonic.

WHEN FIRE FLAPS LT ON (OR HANDLE PULLED + 7 SEC)

Up to 7 seconds is the operating time required to close the fire flaps.
If the FIRE FLAPS light is not on within 7 seconds the indicator may be at fault or one or more of the doors may not have completely closed.

1 SHOT .... PRESS E

Press 1 SHOT push button of affected engine.

At the same time as the 1 SHOT push button is pressed the clock should be started to time the action.
The engine fire should be extinguished within 30 seconds of discharging the fire extinguisher, this will be indicated by the light in the engine shut down handle going out. Pressing the 1SHOT push button also causes the FIRE FLAPS light to go out.

— — — — — — — — — — —

IF ENGINE SHUT DOWN HANDLE LT FLASHING AFTER 30 SECS
2 SHOT .... PRESS E

Press 2 SHOT push button of affected engine.

Pressing the 2 SHOT push button discharges the adjacent engine fire extinguisher bottle into the affected engine bay. When an engine first and second shot has been used there is no extinguishant remaining on that side of the aircraft.

(Unchanged)

SPEED .... SUBSONIC C

Reduce speed to subsonic using normal engine throttling technique during descent at 350 kts.

contd.

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ADJACENT ENGINE THROTTLE MASTER..........................MAIN E

Verify the THROTTLE MASTER selector of the adjacent engine at MAIN

The T1 ENGINE PROBE supplies temperature information to the MAIN throttle control system of its own engine and the ALTERN throttle control system of the adjacent engine. Therefore to ensure, following an engine shut down that the adjacent engine throttle control system is receiving correct temperature information, the MAIN system should be selected.

AUTO THROTTLE MASTER..................................OFF E

Verify AUTO THROTTLE MASTER switch of affected engine off.

The AUTO THROTTLE MASTER switch is set to OFF isolating the associated engine from the auto throttle system.

CSD...DISC E

Unguard and set associated CSD disconnect switch to DISC and release.

The CSD is disconnected to prevent over-heating of the CSD oil due to loss of cooling fuel flow across CSD oil cooler.

Reset of the CSD is only possible on the ground with the engine stopped.

IF FIRE PERSISTS
CLEAN UP DRILL ....APPLY E
IMMEDIATELY

If the fire persists the only possible action is to confirm operation of the fire handle. Therefore the entire CLEAN UP DRILL should be completed without delay.

APPROPRIATE WARNING..................................RESET E

(Unchanged)

TCA OVERHEAT

Rotate the ENG O/HEAT TEST rotary selector to RESET then OFF.
The relevant warning light should be observed off.

ENGINE OVERHEAT

Rotate the ENG O/HEAT TEST rotary selector to RESET then OFF.
The relevant warning light should be observed off.

contd.

OTHER WARNINGS

The OIL ENG low pressure lights and LEAK lights have no cancel facility and will therefore remain on for the remainder of the flight.

The engine inlet LOW PRESS, blue and green hydraulic LOW PRESS, GEN, CSD lights and T1 probe heater light once activated, will remain on for the remainder of the flight. Yellow hydraulic pump LOW PRESS lights will go off when associated pump selector is set to SHUT.

SYSTEM FAILURE PROCEDURES .... APPLY E

Carry out CLEAN UP DRILL on Captains' command when aircraft is established in its new flight regime.

END//

CLEAN UP DRILL

AUTO IGNITION	OFF	E
HP VALVE	SHUT	E
THROTTLE LEVER	IDLE	E
REHEAT	OFF	E
ENGINE RECIRCULATION VALVE	OPEN	E
SECONDARY AIR DOORS	SHUT	E
BLEED VALVE	SHUT	E
CROSSBLEED VALVE	SHUT	E
LP VALVE	SHUT	E
HYD PUMP(S)	SHUT	E
APPROPRIATE WARNING	RESET	E
SYSTEM FAILURE PROCEDURES	APPLY	E

FOUR ENGINE FLAME OUT ABOVE M = 1.2

FUEL FWD TRANS sw .... O/RIDE C

Unguard and set the FUEL FWD TRANS switch to O/RIDE to initiate the forward transfer of fuel. Monitor the CG position and use the FUEL FWD TRANS switch to control fuel transfer until manual control by Flight Engineer.

TANK 9 & TANK 10 PUMP sels ....VERIFY OFF E

This action ensures that 9 & 10 tank pumps do not interfere with forward trim transfer.

SERVO CONTROLS YELLOW rty sel .... YELLOW GREEN C

Pull and rotate SERVO CONTROLS yellow rotary selector to YELLOW/GREEN position to ensure the maximum green system hydraulic power is available for the emergency generator.

ENGINE FEED PUMPS .... ALL ON E

Verify all ENGINE FEED PUMPS are switched on since some pumps will be lost when the generators go off-line at M = 1.10

FWD EXTRACT FANS .... ALL ON E

Set the FWD EXTRACT FANS to ALL ON to ensure a cooling airflow for the forward equipment bay when air conditioning is lost.

— — — — — — — — — — —

After the initial indication of malfunction the N2 should be monitored carefully to establish if the engine is being auto-relit, indicated by N2 above 75% with a rising EGT.

If N2 less than 75%

THROTTLES .... IDLE E

The throttles are retarded since the manual relight system is inhibited with them away from idle.

(Deletion)

HP VALVES .... SHUT E

Set the HP VALVES to SHUT to prevent flooding the engine with fuel.

AUTO IGNITION .... OFF E

Set the AUTO IGNITION switches to OFF to prevent interaction between auto ignition systems and attempts at manual relighting.

ENGINE FUEL FEED .... CHECK E

Scan the FUEL MANAGEMENT PANEL to ensure correct engine fuel feed.

TRIM TRANSFER .... CHECK E

Check state of fuel transfer.

START RELIGHT sels .... RELIGHT E

Set the START RELIGHT selectors to RELIGHT in preparation for relight of engines.

30 SECS AFTER CLOSURE OF HP VALVES

30 secs is the minimum time to allow for drainage of fuel from engines.

HP VALVES .... OPEN E

Set the HP VALVES switches to OPEN to initiate the relight, this being indicated by a rising EGT. The rise in EGT should take place within 20 secs of opening the HP VALVE. At N2 of 68% the START/RELIGHT selector is set to OFF.

ON ANY ENGINE THAT FAILS TO RELIGHT WITHIN 20 SECS

HP VALVE .... SHUT E

Set HP VALVE switch to SHUT to stop the engine from flooding with fuel.

Allow engine to drain and continue with relight attempts.

30 secs is the drainage time required after HP VALVE closure for the first relight attempt.
If circumstances permit and further relight attempts are required allow a drainage time of 1 minute between each attempt.

(Unchanged)

IF ALL ENGINES FAIL TO RELIGHT

AT APPROXIMATELY M = 1.20
In anticipation of loss of main electrics if no engines relit

TANK 9 INLET VALVES O/RIDE sels .... OPEN E

Set tank 9 INLET VALVES O/RIDE selectors to OPEN. The O/RIDE selectors are used because they are electrically supplied from the essential busbars.

TANK 11 PUMP GREEN AND PUMP BLUE sels .... ON E

Set TANK 11 PUMP GREEN AND PUMP BLUE selectors ON.

The hydraulic pumps in tank 11 are used to transfer the fuel forward since the electric pumps will not be powered with loss of main electrics.

Tank 11 hydraulic pumps together with tank 9 inlet valves are used to transfer fuel forward to obtain CG of 53.5%. The rate of CG movement can be controlled by switching of tank 11 pumps.

TRIM TRANS AUTO MASTER sel .... OFF E

Verify the TRIM TRANS AUTO MASTER selector at OFF to prevent inadvertent transfer should main electrics be restored

FUEL FWD TRANS sw .... GUARDED E

Set the guard of the FUEL FWD TRANS switch since control of the forward fuel transfer should be manually controlled to obtain a CG of 53.5% by operation of tank 9 inlet valve.

RAM AIR TURBINE .... DEPLOY E

Unguard and set the left hand RAM AIR TURBINE selector to ON to deploy the RAT, if the RAT light is not on within 2 sec set the right hand selector to ON.

NOTE
The RAM AIR TURBINE cannot be retracted in flight.

REAR EXTRACT STANDBY FAN .... ON E

Set the REAR EXTRACT STANDBY FAN switch to ON, to ensure rear equipment rack cooling with loss of air generation supply flow.

EMERG GEN .... MANUAL E

Unguard and set the EMERG GEN selector to MANUAL and observe the SELECTED light (blue) on, to confirm the emergency generator selection

When the N2 of engines 1 and 2 falls below 58% the auto shed breaker opens shedding No 3 and No 4 a.c. essential busbars.

AIR INTAKE LANE rty sel ....1 & 3 TO A
2 & 4 TO B E

With the AIR INTAKE, LANE rotary selector for intakes No.1 and No.3 at the non-auto A position and intakes No. 2 and No. 4 at the non-auto B position, the A control lanes of intakes No.1 and No.3 and the B control lanes of intakes No. 2 and No. 4 are powered from the a.c. essential busbars.

AIR INTAKE HYD sel .... 1 TO GREEN
3 TO BLUE
2 & 4 TO YELLOW E

Selecting the INTAKE HYD selectors to GREEN, BLUE or YELLOW selects the appropriate hydraulic system since loss of the d.c. busbars loses the ability to select the standby hydraulic system to intakes 1 & 3 and the main hydraulic systems to intakes 2 & 4.

THROTTLE MASTERS ....MAIN E

The THROTTLE MASTER selectors are set to MAIN since all MAIN throttle control lanes are supplied from the a.c. essential busbars.

F/O ASI AND ALTIMETER .... STANDBY MODE P

Rotate First Officer's ASI and Altimeter mode selectors to S (Standby) in preparation for the loss of ADC No.2.

When at S (Standby) the ASI and Altimeter receive information from the nose pitot probe.

ADC 2 .... OFF P

ADC No.2 will be lost with main electrical supply at approximately M = 1.10. To prevent the nuisance of spurious overspeed warnings due to circuit design ADC No.2 can be switched off.

EMERG RELIGHT BUSBAR .... 2 E

Rotate the EMERG RELIGHT BUSBAR selector to position 2 to power No. 2 engine relight busbar 25X.

ENGINE FUEL FEED ....CHECK E

Scan FUEL MANAGEMENT PANEL to ensure engine feed preparatory to starting engine No. 2.

TRIM TRANSFER ....CHECK E

Concurrent with the relight attempts monitor the forward fuel transfer to achieve a CG position of 53.5%.

30 SECS AFTER CLOSURE OF HP VALVES

NO.2 ENGINE HP VALVE ....OPEN E

Setting the HP VALVE switch to OPEN initiates the relight attempt, successful light up is indicated by rising EGT and N2, there will be no N1 indication at this time since power to the N1 instrument is taken from the sheddable busbar.

IF NO 2 ENGINE FAILS TO RELIGHT IN 20 SEC
NO 2 ENGINE HP VALVE ....SHUT E

EMERG RELIGHT BUSBAR .... 4 E

Rotate the EMERG RELIGHT BUSBAR selector to position 4 to power engine No. 4 relight busbar 27X.

NO 4 ENGINE HP VALVE .... OPEN E

IF NO 4 ENGINE FAILS TO RELIGHT IN 20 SEC
NO 4 ENGINE HP VALVE .... SHUT E

REPEAT FOR ENGINES 3 & 1, THEN AS NECESSARY

Attempt to relight engines No 3 and No 1 using the EMERG RELIGHT busbar rotary selector position 3 & 1, then as necessary at positions 1,2,3 and 4 until a relight is obtained.

IF ALL ENGINES FAIL TO RELIGHT

AT M = 0.90
SERVO CONTROLS BLACK rty sel ....GREEN ONLY C

Setting the SERVO CONTROL black rotary selector to GREEN only ensures that blue hydraulic system power is available to drive the blue trim transfer pump. A flight control channel change, indicated by the flight control channel MIs (8) reading G also takes place. If they do not read G press the appropriate O & M ELEVONS, IN ELEVONS or RUDDER reset push button.

DITCHING & EMERGENCY LANDING DRILLS ....REVIEW ALL

RELIGHT ATTEMPTS .... CONTINUE E

(Deletion)

WHEN VISOR/NOSE LOWERING REQUIRED
LOWER VISOR/NOSE USING VISOR/NOSE STANDBY LOWERING

contd.

AT 10,000 FT

CAPTAINS ASI AND ALTIMETER ....STANDBY MODE C

Rotate Captain's ASI and Altimeter mode selectors to S (Standby) in preparation for the loss of ADC No.1.

When at S (Standby) the ASI and Altimeter receive information from the nose pitot probe.

ADC 1 .... OFF P

ADC 1 will be lost with essential electrical supply when the emergency generator is isolated. To prevent the nuisance of spurious overspeed warnings due to circuit design ADC No. 1 can be switched off.

SPEED ....270 KT C

Reduce aircraft speed to 270 kt.

EMERG GEN ....ISOL E

Set the EMERG GEN selector to ISOL to cut off hydraulic supplies to the emergency generator since the available hydraulic supply is required for flying controls.

With the loss of emergency generator relight attempts should cease.

RAMP/SPILL MASTERS ....MAN E

Set the RAMP/SPILL MASTER switches to MAN to cut off hydraulic supplies to the air intakes.

IF LANDING GEAR LOWERING REQUIRED
LOWER LANDING GEAR USING LANDING GEAR STANDBY LOWERING

BRAKES .... EMERG C

Set BRAKES lever to EMERG

APPROACH SPEED ....250 KT C

MINIMUM LANDING SPEED .... 200 KT C

END//

PRINTED IN ENGLAND

FOUR ENGINE FLAME OUT BELOW M = 1.2

RAM AIR TURBINE ....DEPLOY E

Unguard and set the left hand RAM AIR TURBINE selector to ON to deploy the RAT, if the RAT light is not on within 2 sec set the right hand selector to ON.

NOTE
The RAM AIR TURBINE cannot be retracted in flight.

TANK 9 INLET VALVES O/RIDE sels ....OPEN E

Set tank 9 INLET VALVES O/RIDE selectors to OPEN. The O/RIDE selectors are used because they are electrically supplied from the essential busbars.

TANKS 5,7 & 11 INLET VALVES
O/RIDE sels ....SHUT E

Tanks 5,7 & 11 VALVES O/RIDE selectors are used to shut the associated tank inlet valves to prevent fuel being transferred into these tanks should they be open when main generation power is lost. The O/RIDE sels are powered from the essential busbar.

TANK 11 PUMP GREEN AND PUMP BLUE sels .... ON E

Set TANK 11 PUMP GREEN AND PUMP BLUE selectors ON. The hydraulic pumps in tank 11 are used to transfer the fuel forward since the electric pumps will not be powered with loss of main electrics.

Tank 11 hydraulic pumps together with tank 9 inlet valves are used to transfer fuel forward to obtain CG of 53.5%. The rate of CG movement can be controlled by switching of tank 11 pumps.

SERVO CONTROLS YELLOW rty sel ....YELLOW GREEN C

Pull and rotate SERVO CONTROLS yellow rotary selector to YELLOW/GREEN position to ensure the maximum green system hydraulic power is available for the emergency generator.

SERVO CONTROLS BLACK rty sel
(IF LESS THAN M = 0.90) ....GREEN ONLY C

Setting the SERVO CONTROL black rotary selector to GREEN only ensures that blue hydraulic system power is available to drive the blue trim transfer pump. A flight control channel change, indicated by the flight control channel MIS (8) reading G also takes place. If they do not read G press the appropriate O & M ELEVONS, IN ELEVONS or RUDDER reset push button.

ENGINE FEED PUMPS ....ALL ON E

Verify all ENGINE FEED PUMPS are switched on since some pumps will be lost when the generators go off-line at M = 1.10

REAR EXTRACT STANDBY FAN ....ON E

Set the REAR EXTRACT STANDBY FAN switch to ON, to ensure rear equipment rack cooling with loss of air generation supply flow.

EMERG GEN .... MANUAL E

Unguard and set the EMERG GEN selector to MANUAL and observe the SELECTED light (blue) on, to confirm the emergency generator selection

When the N2 of engines 1 and 2 falls below 58% the auto shed breaker opens shedding No 3 and No 4 a.c. essential busbars.

AIR INTAKE LANE rty sel .... 1 & 3 TO A
2 & 4 TO B E

With the AIR INTAKE LANE rotary selector for intakes No. 1 and No. 3 at the non-auto A position and intakes No. 2 and No. 4 at the non-auto B position, the A control lanes of intakes No. 1 and No. 3 and the B control lanes of intakes No. 2 and No. 4 are powered from the a.c. essential busbars.

AIR INTAKE HYD sel .... 1 TO GREEN
3 TO BLUE
2 & 4 TO YELLOW E

Selecting the INTAKE HYD selectors to GREEN, BLUE or YELLOW selects the appropriate hydraulic system since loss of the d.c. busbars loses the ability to select the standby hydraulic system to intakes 1 & 3 and the main hydraulic systems to intakes 2 & 4.

After the initial indication of malfunction the N2 should be monitored carefully to establish if the engine is being auto-relit, indicated by N2 above 75% with a rising EGT.

If N2 less than 75%

THROTTLES .... IDLE C

The throttles are retarded since the manual relight system is inhibited with them away from idle.

HP VALVES ....SHUT E

Set the HP VALVES to SHUT to prevent flooding the engine with fuel.

AUTO IGNITION ....OFF E

Set the AUTO IGNITION switches to OFF to prevent interaction between auto ignition systems and attempts at manual relighting.

THROTTLE MASTERS ....MAIN E

The THROTTLE MASTER selectors are set to MAIN since all MAIN throttle control lanes are supplied from the a.c. essential busbars.

F/O ASI AND ALTIMETER .... STANDBY MODE P

Rotate First Officer's ASI and Altimeter mode selectors to S (Standby) in preparation for the loss of ADC No.2.

When at S (Standby) the ASI and Altimeter receive information from the nose pitot probe.

ADC 2 .... OFF P

ADC No.2 will be lost with main electrical supply at approximately M = 1.10. To prevent the nuisance of spurious overspeed warnings due to circuit design ADC No.2 can be switched off.

START RELIGHT sels ....RELIGHT E

Set the START RELIGHT selectors to RELIGHT in preparation for relight of engines.

EMERG RELIGHT BUSBAR ....2 E

Rotate the EMERG RELIGHT BUSBAR selector to position 2 to power No. 2 engine relight busbar 25X.

ENGINE FUEL FEED ....CHECK E

Scan FUEL MANAGEMENT PANEL to ensure engine feed preparatory to starting engine No. 2

TRIM TRANSFER ....CHECK E

Concurrent with the relight attempts monitor the forward fuel transfer to achieve a CG position of 53.5%.

30 SECS AFTER CLOSURE OF HP VALVES

NO.2 ENGINE HP VALVE ....OPEN E

Setting the HP VALVE switch to OPEN initiates the relight attempt, successful light up is indicated by rising EGT and N2, there will be no N1 indication at this time since power to the N1 instrument is taken from the sheddable busbar.

IF NO.2 ENGINE FAILS TO RELIGHT IN 20 SEC

NO 2 ENGINE HP VALVE ....SHUT E

EMERG RELIGHT BUSBAR .... 4 E

Rotate the EMERG RELIGHT BUSBAR selector to position 4 to power engine No. 4 relight busbar 27X.

No. 4 ENGINE HP VALVE ....OPEN E

IF NO 4 ENGINE FAILS TO RELIGHT IN 20 SEC

NO 4 ENGINE HP VALVE ....SHUT E

REPEAT FOR ENGINES 3 & 1 THEN AS NECESSARY

Attempts to relight engines No.3 and No.1 using the EMERG RELIGHT busbar rotary selector position 3 & 1, then as necessary at positions 1,2,3 and 4 until a relight is obtained.

IF ALL ENGINES FAIL TO RELIGHT

AT M = 0.90

SERVO CONTROLS BLACK rty sels .... GREEN ONLY C

Setting the SERVO CONTROL black rotary selector to GREEN only ensures that blue hydraulic system power is available to drive the blue trim transfer pump. A flight control channel change, indicated by the flight control channel MIS(8) reading G also takes place. If they do not read G press the appropriate O & M ELEVONS, IN ELEVONS or RUDDER reset push button.

DITCHING & EMERGENCY LANDING DRILLS ....REVIEW ALL

RELIGHT ATTEMPTS ....CONTINUE E

IF THE VISOR IS DOWN

VISOR/NOSE STBY CONTROL sw ....VISOR LOWER P

With the visor down the VISOR/NOSE STBY CONTROL switch is set to VISOR LOWER to ensure that no green hydraulic system fluid circulates through the nose/visor system.

IF VISOR/NOSE LOWERING REQUIRED

LOWER VISOR/NOSE USING VISOR/NOSE STANDBY LOWERING and/or NOSE STANDBY LOWERING

contd.

AT 10000 FT

CAPTAINS ASI AND ALTIMETER .... STANDBY MODE C

Rotate Captain's ASI and Altimeter mode selectors to S (Standby) in preparation for the loss of ADC No.1.

When at S (Standby) the ASI and Altimeter receive information from the nose pitot probe.

ADC 1 .... OFF P

ADC 1 will be lost with essential electrical supply when the emergency generator is isolated. To prevent the nuisance of spurious overspeed warnings due to circuit design ADC No.1 can be switched off.

SPEED .... 270 KT C

Reduce aircraft speed to 270 kt.

EMERG GEN ....ISOL E

Set the EMERG GEN selector to ISOL to cut off hydraulic supplies to the emergency generator since the available hydraulic supply is required for flying controls.

With the loss of emergency generator relight attempts should cease.

RAMP/SPILL MASTERS ....MAN E

Set the RAMP/SPILL MASTER switches to MAN to cut off hydraulic supplies to the air intakes.

▶ IF LANDING GEAR LOWERING REQUIRED
LOWER LANDING GEAR USING LANDING GEAR STANDBY LOWERING

BRAKES ....EMERG C

Set BRAKES lever to EMERG

APPROACH SPEED ....250 KT C

MINIMUM LANDING SPEED ....200 KT C

END//

(Deletion)

SERVO CONTROL SPOOL VALVE JAM

SERVO CONTROLS BLACK rty sel .... TOWARDS JAM LT C

Rotate the SERVO CONTROLS BLACK rotary selector towards the illuminated GREEN JAM or BLUE JAM light. This cuts off the hydraulic supply to the associated side of the eight servo controls, i.e. BLUE JAM selection cuts off BLUE hydraulics supply. Control of the servos is regained but they are now operating on half bodies, reducing their power by approximately half.

IF THE BLACK rty sel WILL NOT MOVE

SERVO CONTROLS YELLOW rty sel .... NORMAL C

Rotate the SERVO CONTROLS YELLOW rotary selector to NORMAL.

If the SERVO CONTROLS YELLOW rotary selector had been previously selected to the affected system the SERVO CONTROLS panel interlock mechanism will not allow movement of the BLACK rotary selector towards the BLUE JAM OR GREEN JAM light until the YELLOW rotary selector is at NORMAL.

Rotating the YELLOW selector to NORMAL cuts the yellow hydraulic supply to the previously selected systems, bringing on its L PRESS light.

SERVO CONTROLS BLACK rty sel .... TOWARDS JAM LT C

Rotate the SERVO CONTROLS BLACK rty sel towards the illuminated GREEN JAM or BLUE JAM light.

If the BLACK rotary selector did not move because of a yellow/green selection the returning of yellow rotary selector to NORMAL and selection of BLUE ONLY loses the anti skid braking therefore the BRAKE lever should be set to EMERG.

IF SPEED GREATER THAN M = 0.93

REDUCE SPEED TO 350 KT AT CONSTANT PRESSURE ALTITUDE
THEN DESCEND AT 350 KT TO M = 0.93

Replan flight at Subsonic speed.

END//

NOTE

Should low pressure occur in the remaining main system, yellow system will be automatically selected to replace it.

CONTROL COLUMN JAM IN PITCH OR ROLL

CAUTION
THE EMERGENCY FLIGHT CONTROL SYSTEM IS TO BE USED ONLY IN THOSE CASES OF JAMMING WHERE FORCE ON THE CONTROL COLUMN/WHEEL PRODUCES IN THE PARTICULAR AXIS NO MOVEMENT OF THE COLUMN/WHEEL IN THE DIRECTION DEMANDED.

AUTOSTAB (PITCH & ROLL) .... ENGAGED C

Verify AUTOSTAB No. 1 PITCH and ROLL or AUTOSTAB No. 2 PITCH and ROLL sws are engaged.

NOTE
It is essential for operation of the emergency flight controls that the autostab pitch and roll axis of the same system be engaged.

CONTROL FORCES .... RELAX C

Release pressure on control column/wheel at moment of engaging the emergency flight controls to avoid sudden or perhaps excessive control input.

EMERGENCY FLIGHT CONTROLS .... ENGAGE C

Press the EMERG CONT push button once to engage the pitch and roll emergency flight controls
Observe EMERG CONT lt (green) on

NOTE
If a pitch autostab disengages whilst Emergency Flight Control is in use, the associated roll autostab disengages: similarly, if a roll autostab disengages whilst Emergency Flight Control is in use, the associated pitch autostab disengages.

Re-engagement of the pitch or roll autostab is inhibited when the EMERG CONT push button is in the engaged position.

END//

(Unchanged)

LOW HYDRAULIC PRESSURE AT FLYING CONTROLS

SERVO CONTROLS YELLOW rty sel .... OBSERVE C

▶ IF SERVO CONTROLS YELLOW rty sel AT NORMAL

SERVO CONTROLS YELLOW rty sel .... TOWARDS L/PRESS LT C

Pull and turn SERVO CONTROLS yellow rotary selector towards the illuminated L/PRESS light and observe the L/PRESS light goes off, pea lights (green) (4) associated with system status, on and MWS PFC light off.

Moving the SERVO CONTROLS yellow rotary selector away from NORMAL automatically on-loads the yellow hydraulic system engine driven pumps.

FLYING CONTROL SIGNALLING MODE .... CHECK.RESET IF REQ'D C

On flight controls position indicator observe channel MIs and if necessary press the appropriate O&M ELEVONS, IN ELEVONS or RUDDER, RESET push button to attempt a reset to the selected signalling mode.

END//

CAUTION

IF, AFTER SELECTION, A FALL IN THE LEVEL OF THE YELLOW TANK IS NOTED, AWAIT AUTOMATIC ISOLATION OF THE FAILED SYSTEM BY THE 1ST LOW LEVEL WARNING ON THE YELLOW TANK. THIS PRODUCES THE SECOND LOW PRESSURE WARNING. LEAVE THE SELECTOR IN ITS EXISTING POSITION AS IN THE FOLLOWING CASE.

▶ IF SERVO CONTROLS YELLOW rty sel AT YELLOW BLUE OR YELLOW GREEN AND ONE L/PRESS LIGHT ON

SERVO CONTROLS YELLOW rty sel .... LEAVE IN EXISTING POSITION C

The SERVO CONTROLS yellow rotary selector is left in the selected position because:-

1. if the L/PRESS light is on due to a loss of the yellow system, the first low level cut-out will have operated. Any subsequent selection causes the loss of the low level protection and therefore NO selection should be made unless a further failure occurs.

contd.

2. if the L/PRESS light is on due to the loss of the other main system the yellow system must be left supplying the original failed main system.

FLYING CONTROL SIGNALLING MODE .... CHECK.RESET IF REQ'D C

On flight control position indicator observe channel MIs and if necessary, press the appropriate O&M ELEVONS, IN ELEVONS or RUDDER, RESET push button to attempt a reset to the selected signalling mode.

— — — — — — — — — — —

END//

IF SERVO CONTROLS YELLOW rty sel AT YELLOW BLUE OR YELLOW GREEN AND TWO L/PRESS LTS ON

SERVO CONTROLS YELLOW rty sel .... TOWARDS OTHER L/PRESS LT C

Pull and turn SERVO CONTROLS yellow rotary selector towards the other L/PRESS light

FLYING CONTROL SIGNALLING MODE .... CHECK.RESET IF REQ'D C

On flight control position indicator observe channel MIs and if necessary, press the appropriate RESET push button to attempt a reset to the selected signalling mode.

END//

TEMPORARY REVISION
Insert facing 02.04 page 02

REASON FOR ISSUE:

Fitment of modified Servo Control Panel.

When a modified Servo Control Panel is fitted the following notes supplement the existing expansion and cautions:-

IF SERVO CONTROLS YELLOW rty sel AT YELLOW BLUE OR YELLOW GREEN AND TWO L/PRESS LTS ON

Servo Controls Yellow rty sel ....TOWARDS OTHER L/PRESS LT. C

Pull and turn the Yellow rty sel towards the other Low Pressure light. An autochangeover will already have taken place. The hard selection confirms the autochangeover and extinguishes the Low Pressure light on the side to which the Yellow rty sel is set.

NOTES

Should a low pressure occur in a flying control hydraulic system that is being powered by the standby system and a low pressure exists in the other flying control main hydraulic system, an automatic change, of the standby (yellow) system to power the failed second system occurs.

This will be indicated by the pea lights associated with the yellow rotary selector position going off and the non-selected position pea lights coming on.

The L/PRESS light of the second main system will remain on until yellow SERVO CONTROLS rotary selector is rotated to the correct position.

If a PCU internal failure joins blue and green system then ultimately all the usable hydraulic fluid may be in the Yellow system which would, in this case, power both the green and blue sides of the PCU jacks. For these conditions to exist an autochangeover and a rise in Yellow contents above first low level must have taken place.

This will be indicated by both the Yellow Blue and the Yellow Green pea lights being on at the same time.

The flying controls are still powered by one hydraulic system in this condition.

14/12

HYDRAULIC POWER

CAUTION

WITH THE FLYING CONTROLS POWERED BY A SINGLE HYDRAULIC SYSTEM, MANOEUVRABILITY IN THE TRANSONIC REGION IS RESTRICTED.

IF FAILURE OCCURS AT LESS THAN M = 0.93

DO NOT EXCEED M = 0.93

IF FAILURE OCCURS ABOVE M = 0.93

DECELERATE TO THE AUTHORISED SUBSONIC REGIME USING THE FOLLOWING TECHNIQUE, AVOIDING THE CG BOUNDARIES.

REDUCE SPEED TO 350 KT AT CONSTANT ALTITUDE THEN DESCEND AT 350 KT TO M = 0.93

A complete summary of the effects of loss of hydraulic systems is given in the CHECKLISTS Vol.II.07.04.05/06.

PRINTED IN ... AND

DISCREPANCY BETWEEN ADC 1 AND ADC 2

FLY ATTITUDE

Fly the aircraft using basic attitude information presented by the ADI or the Standby Horizon.

STANDBY ASI/MACHMETER .... USE CP

The Captain should call speeds using the Standby ASI/Machmeter which is immediately available without switch selection.

In the event of the Co-pilot flying the aircraft, control should immediately be handed over to the Captain.

ADS PROBE HEATERS .... VERIFY ON E

AUTOTHROTTLE 1 & 2 .... DISENGAGE C

Set AT 1 and AT 2 switches to off since the autothrottle system may be receiving false information.

FAULTY SYSTEM .... IDENTIFY CP

Should a discrepancy warning between the two systems be received it is necessary to diagnose which system is at fault, particularly since some related systems will accept erroneous information without signalling an error.

The faulty system may be identified by comparing each Machmeter and ASI with the Standby ASI/Machmeter or by comparing the calculated angle of attack with readings on both angle of attack indicators. Angle of attack in level flight can be determined by direct comparison with pitch attitude.

When faulty system identified
APPLY PROCEDURE: ADC FAILURE

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NAVIGATION SYSTEM

LOSS OF A SECOND ADC

If transient failure of an ADC occurs it may be possible to regain it by reset action. At least two seconds must elapse after failure indication before reset is effective.

If the ADC fails after glide slope capture below 1,500 ft the affected autopilot, flight director and electric trim will not disengage.

The affected anti-stall SYSTEM FAIL light will come on only when the air speed is less than 270 kt.

FLY ATTITUDE

Fly the aircraft using basic attitude information presented by the Attitude Director Indicator or the Standby Horizon.

STANDBY ASI/MACHMETER .... USE CP

Captain should call speeds using STANDBY ASI MACHMETER which is immediately available for reference without switch selection.

ASI & ALTIMETERS .... STANDBY MODE CP

Rotate Captain's and First Officer's ASI and Altimeter mode selectors to S (Standby).

When at S (Standby) the ASI and Altimeter receive information from the nose pitot probe.

Resume normal use of ASIs and altimeters.

IF LOSS OCCURS DURING TRANSONIC ACCELERATION

TRIM TRANSFER .... HOLD E

SPEED & ALTITUDE .... HOLD C

FAILED ADC .... OFF P

Set failed ADC switch to off.

(Deletion)

NAVIGATION SYSTEM

Loss of both ADCs will result in the loss of the following significant services:-

(a) all speed warnings and CG boundary warnings

(b) both artificial feel, both electric trims, both autostab systems, both APs, ATs and FDs.

(c) all high incidence protection systems.

(d) all power plant speed switched or controlled functions Note, buckets run to zero degree position.

ENGINE CONTROL SCHEDULE .... ABOVE 220 KT HI
BELOW 220 KT LO E

The aircraft speed should be observed and if greater than 220 kt set the ENGINE CONTROL SCHEDULE selector to HI.
If aircraft speed less than 220 kt set the ENGINE CONTROL SCHEDULE selector to LO.

SECONDARY AIR DOORS .... ABOVE 220 KT OPEN
BELOW 220 KT SHUT E

Set the SECONDARY AIR DOORS selectors to OPEN at speeds greater than 220 KT and to SHUT at speeds less than 220 KT.

ANTI-STALL SYSTEMS .... OFF P

Set the ANTI-STALL SYSTEM switches to OFF.

AUTOSTAB .... RE-ENGAGE ONE SYSTEM P

Set the AUTOSTAB No.1 or No.2 switches (3) to ON. System will operate on "fixed gains".

N2 N1 and EGT .... MANUAL CONTROL
TO CRUISE RATING E

Manual control of N2, N1 and EGT by the throttle will be necessary, because with the ADCs off the engines will operate at the maximum (i.e. warm day) level regardless of the actual temperature.

NOTE
The total temperature on the Flight Engineer's panel is the only temperature source available with both ADCs inoperative.

contd.

IF SPEED ABOVE M = 1.70
MAXIMUM SPEED .... VMO MINUS 10 KT
MMO MINUS .05M C

Continue the flight with the following limitation,
Maximum speed less than VMO minus 10 kt
Mach No. less than MMO minus 0.05 M

IF SPEED BETWEEN M = 0.93 and M = 1.70
SPEED .... REDUCE TO
M = 0.93/V ≤ 380 KT C

CG .... 53% BELOW M = 0.85
55% ABOVE M = 0.85 E

IF SPEED M = 0.93 OR LESS
MAXIMUM SPEED .... M = 0.93/V ≤ 380 KT C

CG .... 53% BELOW M = 0.85
55% ABOVE M = 0.85 E

AT LANDING

CG .... 52.5% E

On landing to compensate for the loss of artificial stability aids the CG should be adjusted to 52.5% and reference speed should be increased to take account of the loss of all high incidence protection systems.

MINIMUM SPEED .... VREF PLUS 10 KT C

END//

NOTES

1. The restrictions on speed and requirements for CG position are because with both ADCs inoperative:

   a) CG limitation data is lost
   b) Only standby Airspeed/Mach number information is available.

2. There is no protection against an inadvertent selection of the Flyover Schedule at speeds above M = 1.0 or below 220 kt.

A complete summary of the effects of ADC failure is given in the CHECKLIST Vol.2B 07.05.04/07.

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FAILURE OF FOUR MAIN GENERATORS

With the four main generators offline the a.c. main busbars and the d.c. main busbars are inoperative with the consequent loss of all services powered from them.

EMERG GEN .... MANUAL E

Unguard and set the EMERG GEN selector to MANUAL and observe the SELECTED light (blue) on.

The emergency generator should come on-line automatically, this action is therefore only confirmatory.

ENGINE FEED PUMPS .... ALL ON E

Verify all ENGINE FEED PUMPS are switched on since some pumps will be lost.

ENGINE RECIRCULATION VALVES .... ALL SHUT E

Set the ENGINE RECIRCULATION VALVES switches to SHUT.

This ensures maximum fuel flow to the engines while only one fuel pump is operating.

CAUTION
THE ENGINE RECIRCULATION VALVE MUST NOT BE OPENED UNTIL AFTER MAIN GENERATION IS RESTORED.

SERVO CONTROLS YELLOW rty sel .... YELLOW GREEN C

Pull and rotate SERVO CONTROLS yellow rotary selector to YELLOW GREEN position to ensure that maximum green hydraulic power is available for the emergency generator.

REAR EXTRACT STANDBY FAN .... ON E

Set the REAR EXTRACT STANDBY fan switch to ON.

The rear extract standby fan is powered from essential busbars.

ELECTRICAL

NOTE

Forward rack extract fans are not powered in this condition.
Maintain cabin differential pressure above 1 PSI as long as possible.

— — — — — — — — — — —

F/O ASI AND ALTIMETER .... STANDBY MODE P

Rotate First Officer's ASI and Altimeter mode selectors to S (Standby).

When at S (Standby) the ASI and Altimeter receive information from the nose pitot probe.

ADC 2 .... OFF P

ADC No.2 will be lost with loss of main electrical supply. To prevent the nuisance of spurious overspeed warnings due to circuit design ADC No.2 can be switched off.

AC ESS BUS sws .... ALL EMERG E

Set AC ESS BUS, NORM EMERG switches (4) to EMERG

This confirms that the emergency generator is on and the a.c. essential busbars are locked on to it therefore even if main generation is re-instated, the a.c. essential busbars cannot revert to a.c. main busbars as a power source.

AC essential busbar NORM EMERG switch must only be set to EMERG if the emergency generator is serviceable.

No.2 AC ESS BUS switch sheds the avionics A busbar 10X and the 26V a.c. main A busbar 12X.
No. 3 AC ESS BUS switch, sheds the avionics B busbar 11X and the 26V a.c. main B busbar 13X.

AIR INTAKES LANE rty sel .... 1 & 3 TO A
2 & 4 TO B E

With the AIR INTAKE LANE rotary selector for intakes No.1 and No.3 at the non-auto A position and intakes No.2 and No.4 at the non-auto B position, the A control lanes of intakes No.1 and No.3 and the B control lanes of intakes No.2 and No.4 are powered from the a.c. essential busbars.

(Deletion)

AIR INTAKES HYD sel .... 1 TO GREEN
3 TO BLUE
2 & 4 TO YELLOW E

Selecting the INTAKES HYD selectors to GREEN,BLUE or

ELECTRICAL

YELLOW selects the appropriate hydraulic system since loss of the d.c. busbars loses the ability to select the standby hydraulic system to intakes 1 & 3 and the main hydraulic system to intakes 2 & 4.

ENGINE CONTROL SCHEDULE .... ABOVE 220 KT HI
BELOW 220 KT LO E

The aircraft speed should be observed and if greater than 220 kt, set the ENGINE CONTROL SCHEDULE selector to HI If aircraft speed less than 220 kt set the ENGINE CONTROL SCHEDULE selector to LO. On emergency electrics the operating schedule will be MID with HI selected and gear up: it will be LO with any other selection.

BATTERY sels ....ESS MAIN SPLIT E

This ensures that the battery is connected to its associated d.c. essential busbar which stays disconnected from the d.c. main busbar. Subsequent restoration of main generation power will not cause reconnection of d.c. essential busbar to d.c. main busbar.

THROTTLE MASTER .... MAIN E

The THROTTLE MASTER selectors are set to MAIN since all MAIN throttle control lanes are supplied from the a.c. essential busbar.

WING & INTAKE ANTI-ICING .... OFF E

While on emergency generator supply only, the wing and intake anti-icing is not powered but, if a main generator is subsequently regained with wing and intake anti-icing selected on, the heavy anti-icing load may put the main generator at risk.

NOTE

Avoid icing conditions as anti-icing is inoperable during flight on emergency electrical power except for the left hand W/S de-ice which is operable at low only, and heating for the standby pitot/static probe and ADS 1 sensors.

ELECTRICAL

GALLEYS .... SHED E

Set GALLEYS, GEN 1&3, GEN 2&4 switches to SHED.

While on emergency generator supply only, the galleys are not powered but, if a main generator is subsequently regained with galleys selected ON the galley load may put the main generator at risk.

GENERATORS .... RECOVER E

For each failed main generator in turn

Set the generator selector to TEST, the AC FREQ/VOLTS rotary selector to the relevant GEN number and observe the frequency and volts are normal.
Set the generator selector to ON, observe the GEN light is off and the GCB MI shows inline.

Systems data:

AC frequency	396 to 404 Hz
AC voltage	110 to 118 volts

▶ IF GENERATOR(S) RECOVERED
APPLY APPROPRIATE PROCEDURES

If 4, 3 or 2 generators are recovered, systems should be restored to normal status where possible.

▶ IF ONLY ONE GENERATOR IS RECOVERED
REVIEW THE DRILL:FAILURE OF THREE MAIN GENERATORS and apply as necessary.

IF ALL GENERATORS REMAIN OFFLINE
No 3 INS MODE .... ATT E

Set No.3 INS mode rotary selector to ATT.

No 3 INS BAT light (amber) should be observed on.

ATT switches off the INS navigation computer and allows No 3 INS to function as attitude reference only, thus reducing the electrical load and approximately doubling the battery life to about 30 minutes, after which the BAT light goes off and the BAT light (red) comes on to show that the battery power is inadequate.

The No 1 INS is powered from a.c. essential busbar No 2 and d.c. essential busbar A.

The No 2 INS will be powered from its own battery. It is operative for approximately 15 minutes in NAV mode or 30 minutes in ATT mode.

W/SHIELD DE-ICE L sel .... LOW P

(Uncha..ged)

PRINTEC NGLAND

Set the W/SHIELD DE-ICE L selector to LOW.

The left side windshield de-icing is powered from No. 1 a.c. essential busbar.

No. 1 & 2 ANTI-STALL .... OFF P

Set No.1 and No.2 ANTI-STALL switches to OFF.

The anti-stall systems are powered from main busbars and are not available during flight on emergency supplies, however they must be selected to OFF to allow the engagement of AUTOSTAB No. 1.

AUTOSTAB No. 1 .... ENGAGE P

Verify AUTOSTAB No. 1 switches (3) are engaged.

ARTIFICIAL FEEL No. 1 .... ENGAGE P

Verify ARTIFICIAL FEEL No. 1 switches (3) are engaged. AUTOSTAB 1 and ARTIFICIAL FEEL 1 will disconnect when main generation is removed. They can then be re-engaged.

F/O INSTRUMENT TRANSFER sws .... ALL LEFT P

Verify the First Officer's instrument transfer switches
at ATT INS 3
COMP 1
DEV 1
NAV INS 1

PLAN TO LAND AT NEAREST SUITABLE AIRFIELD

SPEED .... REDUCE TO SUBSONIC C

Reduce speed to subsonic using normal engine throttling technique during descent at 325 kt and replan for subsonic flight to the nearest suitable airfield.

CAUTION
THE ENGINE RECIRCULATION VALVES MUST NOT BE OPENED UNTIL AFTER MAIN GENERATION IS RESTORED.

IF TANKS 6 AND/OR 8 CONTAIN MORE THAN 1000 KG
INTER-CON VALVES (5-8) AND/OR (6-7) .... OPEN E

Set the INTERCON VALVE switch (6-7) and/or (5-8) to OPEN to allow interflow of fuel between associated tanks This is to enable tank 6 and tank 8 contents to be transferred to collector tanks via the pumps in tank 5.

contd.

ELECTRICAL

and 7 powered by the essential busbars 8 x and 7 x.

IF FUEL IN TANK 11

TANK 11 PUMPS BLUE AND GREEN ....ON E

The trim transfer auto system and tank 11 electric pumps are inoperative.

IF FUEL REQUIRED IN TANK 9

CAUTION
ONCE FUEL IS IN TANK 9 THE ONLY METHOD OF TRANSFER OUT IS GRAVITY FEED.

Using gravity feed, fuel is transferred out of tank 9 by selecting the inlet valves open and maintaining a nose up attitude.

TANK 9 INLET VALVE O/RIDE sels .... OPEN E

The MAIN selector is inoperative and the INLET VALVE MIs remain crosshatched.
Tank 9 contents should be observed increasing.
The rate of CG movement can be controlled using the tank 11 PUMP BLUE and PUMP GREEN.

WHEN TANK 9 FUEL AS REQUIRED.

The tank 9 contents should be the amount required for the planned landing weight.

TANK 9 INLET VALVE O/RIDE sels .... SHUT E

TANK 5 & 7 INLET VALVE O/RIDE sels .... OPEN E

The MAIN selector is inoperative and the INLET VALVE MIs remain crosshatched.

IF FUEL IN TANKS 5 & 7

CROSSFEED rty sels .... ALL INLINE E

TANK 5 & 7 PUMPS sels .... EMERG E

At EMERG the associated pumps are powered from essential busbars and the first standby engine feed pumps of engines 2 and 4 are inhibited.
The engines are now being fed by two pumps only, the first standby engine feed pumps of collector tanks 1 and 3.

PRIOR TO APPROACH CHECKLIST

TANK 5 & 7 PUMPS sels ....OFF E

The engines are now fed by the first standby engine feed pumps of collector tanks 1, 2, 3, 4.

contd.

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ELECTRICAL

LOWER VISOR/NOSE USING STANDBY LOWERING
AT SPEED FOR NOSE DOWN

LOWER LANDING GEAR USING STANDBY LOWERING

SET BRAKES TO EMERG BEFORE LANDING

END//

NOTE
ON EMERGENCY ELECTRICS

The following are AVAILABLE

Normal pressurisation control
Fuel TOTAL CONTENTS indications and FQIs
FASTEN SEAT BELTS and NO SMOKING signs
Standby horizon
Captain's ADF/RMI
First Officer's VOR/RMI
Voice recorder
Public address
TRK/HDG unit
Marker
Interphone audio selector panels (4)
No. 1 ADC, INS, ADI, Compass Coupler & HSI.
No. 1 ADF, VOR, DME, ILS & Radio Altimeter
No. 1 ATC Transponder, VHF & HF

The engine operating schedule will be MID with HI selected and gear up:
it will be LO with any other selection

The following are NOT AVAILABLE

Autopilot
Autothrottle
Normal landing gear operation
Normal visor/nose operation
Visor/nose position indicator
Reverse thrust
Nosewheel steering
Landing lights
Reheat
Normal brakes

FAILURE OF THREE MAIN GENERATORS

WING & INTAKE ANTI-ICING .... OFF E

Verify WING AND INTAKE ANTI-ICING rotary selectors at OFF.

With three main generators off-line wing and intake anti-icing would overload the single remaining generator.

NOTE
Avoid icing conditions as anti-icing is inoperable during flight on emergency electrical power except for the left hand W/S de-ice which is operable at low only, and heating for the standby pitot/static probe and ADC 1 sensors.

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GALLEYS .... SHED E

Set GALLEYS, gen 1&3, GEN 2&4 switches to SHED.

With three main generators off-line, galley loads may overload the single remaining generator.

EMERG GEN .... MANUAL
-CHECK VOLTS
& FREQUENCY E

Unguard and set the EMERG GEN selector to MANUAL and observe the SELECTED light (blue) on. Set the AC FREQ/VOLTS rotary selector to EMERG PWR and observe the frequency and volts are normal.

The EMERG GEN selector is set to MANUAL when a.c. essential busbar changeover to emergency power is impending, thereby reducing duration of power interrupt at essential busbars.

Systems data (emergency generator)

Maximum load	30 KVA (25 KW)
AC frequency	390 to 410 Hz
AC voltage	110 to 118 volts

F/O ASI AND ALTIMETER .... STANDBY MODE P

Rotate First Officer's ASI and Altimeter mode selectors to

S (Standby) in preparation for the loss of ADC No. 2.

When at S (Standby) the ASI and Altimeter receive information from the nose pitot probe.

F/O INSTRUMENT TRANSFER sws .... ALL LEFT P

Verify the First Officer's instrument transfer switches
at ATT INS 3
COMP 1
DEV 1
NAV INS 1

ADC 2 .... OFF P

ADC No.2 will be lost with loss of main electrical supply. To prevent the nuisance of spurious overspeed warnings due to circuit design ADC No.2 can be switched off.

SERVO CONTROLS YELLOW rty sel .... YELLOW GREEN C

Pull and rotate SERVO CONTROLS yellow rotary selector to YELLOW GREEN position to ensure the maximum green hydraulic power is available for the emergency generator.

AC ESS BUS sws .... ALL EMERG E

Set AC ESS BUS, NORM EMERG switches (4) to EMERG

This confirms that the emergency generator is on and the a.c. essential busbars are locked on to it therefore even if main generation is re-instated, the a.c. essential busbars cannot revert to a.c. main busbars as a power source.

AC essential busbar NORM EMERG switch must only be set to EMERG if the emergency generator is serviceable.

No.2 AC ESS BUS switch sheds the avionics A busbar 10X and the 26 V a.c. main A busbar 12X.
No.3 AC ESS BUS switch, sheds the avionics B busbar 11X and the 26V a.c. main·busbar 13X.

No. 1 & 2 ANTI-STALL .... OFF P

Set No.1 and No.2 ANTI-STALL switches to OFF.

The anti-stall systems are powered from main busbars and are not available during flight on emergency supplies; however they must be selected to OFF to allow the engagement of AUTOSTAB No. 1 system.

With failure of three main generators the ANTI-STALL switches are set to OFF as a precautionary measure because if the fourth generator goes unserviceable, the Autostab would be automatically lost, until ANTI-STALL is switched OFF.

ELECTRICAL

AUTOSTAB No. 1 .... ENGAGE P

Verify No. 1 AUTOSTAB switches (3) are engaged.

AUTOSTAB No. 1 is powered from essential busbars.
An interrupt of the essential busbars may cause the AUTOSTAB No.1 to disengage.

ARTIFICIAL FEEL No. 1 .... ENGAGE P

Verify ARTIFICIAL FEEL No. 1 switches (3) are engaged.

ARTIFICIAL FEEL No. 1 is powered from essential busbars.
An interrupt of the essential busbars may cause the ARTIFICIAL FEEL No.1 to disengage.

RADAR .... SYSTEM 2 P

Rotate weather radar selector to SYSTEM 2 because the SYSTEM 1 was lost when the No.2 AC ESS BUS, NORM EMERG switch was set to EMERG.

NOTE

Before an attempt is made to recover failed generators, the emergency generator must power the essential busbars. With only one generator operative it is possible that the attempted recovery of additional main generators could lose all main generation because of faults.

GENERATORS .... RECOVER E

For each failed generator in turn

Set the generator selector to TEST, the AC FREQ/VOLTS rotary selector to the relevant GEN number and observe the frequency and volts are normal.
Set the generator selector to ON, observe the GEN light is off and the GCB MI shows inline.

Systems data	
AC frequency	396 to 404 Hz
AC voltage	110 to 118 volts

IF THREE GENERATORS REMAIN OFF-LINE

KW/KVAR .... MONITOR E

Monitor the KW/KVAR indication to ensure electrical load remains below 54 KW (36 KVAR)

END//

NOTE

WING AND INTAKE ANTI-ICING may be used if necessary but should be kept to a minimum.

The following major services are NOT AVAILABLE with

No.2 AC ESS BUS switch at EMERG	No.3 AC ESS BUS switch at EMERG
No.1 - AFCS - Autothrottle - Electric trim - Safety Flight Control - Radar Blue & Green hydraulic contents gauges Nosewheel Steering No.2 Compass standby supply	No.2 - AFCS - Autothrottle - Electric trim - Autostabs - Artificial Feel - Safety Flight Control - ADC, ADI & HSI - ILS, VOR, DME & ADF - Captains VOR/RMI - Co-pilots ADF/RMI - Radio Altimeter Yellow Hydraulic contents gauge No. 2 Compass normal supply.

NOTE

No.2 Compass will only be inoperative if both No.2 and No.3 switches are at EMERG.

LANDING WITH ABNORMAL LANDING GEAR CONFIGURATION

This procedure is not expanded.

See Emergency Drill Vol. 2B. 07.07.01

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RAPID DEPRESSURIZATION

AUDIO .... CANCEL E

Press to cancel audio warning.

OXYGEN .... ON 100% ALL

All crew members don masks and verify N-100% switch at 100%

CREW COMMUNICATION .... ESTABLISH ALL

On the audio selector panel
Rotate the boom/mask rotary selector to MASK

CABIN ALTITUDE .... CONFIRM WARNING E

Observe CABIN ALT indicator shows more than 10,000 ft

The cabin altitude is limited to 11,000 ft by a cabin altitude limiter on each discharge valve.
The cabin altitude is limited to 15,000 ft by the discharge valve geometry when four air conditioning groups are operating

PASSENGER OXYGEN .... CONFIRM ON. E

Verify passenger oxygen on.

Passenger oxygen masks should deploy automatically if a cabin altitude of 14,000 ft is exceeded.
If necessary unguard and set PASSENGER SYSTEM EMERG MANUAL O/RIDE to ON
Further override facilities are provided at the oxygen control panels in the rear cabin for use in the event of non deployment.

DISCHARGE VALVES .... IF OPEN, SELECT THE OTHER SYSTEM AND CLOSE MANUALLY IF NECESSARY E

GROUND PRESSURE RELIEF VALVE .... SHUT E

Set the GROUND PRESSURE RELIEF VALVE selector to SHUT 1 and observe the GROUND PRESSURE RELIEF VALVE MI reads SHUT

IF CABIN ALTITUDE CANNOT BE CONTROLLED
APPLY PROCEDURE: EMERGENCY DESCENT

AIR CONDITIONING

EMERGENCY DESCENT

REFER ALSO TO PROCEDURES & TECHNIQUES - EMERGENCY DESCENT

THROTTLES .... IDLE C

With the engines at flight idle it is possible to experience a small pop surge at speeds above M = 1.60, this can be ignored.

Announce over the PA system an emergency descent is being initiated.

FUEL FWD TRANS sw .... O/RIDE C

At the same time as the power reduction, the FUEL FWD TRANS switch is set to O/RIDE position until such time as the Flight Engineer can take over control of the fuel transfer.
It is important to begin forward transfer as soon as possible to keep the aircraft in the CG corridor and avoid the REAR CG limit.

TANKS 9 &10 PUMPS sels .... VERIFY OFF E
PRESSURISATION .... MAX RATE OF DESCENT E

On system 1 and system 2 altitude selectors set the rotary selectors R (2) fully clockwise to allow maximum rate of change of cabin altitude

CABIN ALTITUDE sel .... ZERO E

Set the rotary selectors A (2) to obtain required cabin altitude of 0.

ATC TRANSPONDER .... A 7700 C

Rotate the ATC Transponder code selector knobs to obtain A7700 on digital code display

SAFETY HEIGHT .... CHECK P

Obtain safety height from flight log and inform captain

- - - - - - - - - - - -

(Unchanged)

TANK 9 INLET VALVES MAIN sel ....AUTO E

Verify tank 9 INLET VALVE MAIN selectors at AUTO to ensure they are under control of the FUEL FWD TRANS switch or the TRIM TRANS AUTO MASTER selector.

AIR CONDITIONING

TANK 11 PUMPS .... ALL AUTO

Verify tank 11 PUMP GREEN, PUMP BLUE and PUMPS selectors (4) at AUTO to ensure they are under control of the FUEL FWD TRANS switch or the TRIM TRANS AUTO MASTER selector. The four pumps are required during forward transfer whilst in emergency descent to maintain aircraft within the MACH/CG corridor.

TANKS 9 AND 10 LLC .... 8000 KG

Set tank 9 and 10 load limit control to 8000 kg plus the FQI reading of tank 10 in readiness for auto transfer control.

TANK 11 LLC .... ZERO

Set tank 11 load limit control to zero in readiness for auto transfer control.

TRIM TRANS AUTO MASTER sel .... FORWARD

Set the TRIM TRANS AUTO MASTER selector to FORWARD in readiness for auto transfer control.

FUEL FWD TRANS sw .... GUARD

Set the FUEL FWD TRANS switch to its guarded position to place the forward transfer under control of the TRIM TRANS AUTO MASTER and tank 9 and 10 load limit control.

FWD EMERGY RELIEF sw .... OPEN

Set the FWD EMERGY RELIEF switch to OPEN as insurance against loss of extraction flow should the emergency descent have been initiated by pressurisation or associated problems.

FWD EXTRACT FANS .... ALL ON ..

Set the FWD EXTRACT FANS to ALL ON as insurance against loss of extraction flow should the emergency descent have been initiated by pressurisation or associated problems.

(Deletion)

IF OXYGEN HAS BEEN IN USE
WHEN CABIN ALTITUDE DESCENDS TO 15,000 FT OR BELOW

NO SMOKING SIGNS .... ON

Set the NO SMKG switch to ON as a precaution against accidental ignition of oxygen discharging from masks by passengers.

AIR CONDITIONING

CREW OXYGEN .... SELECT N ALL
USE AS REQD

PASSENGER OXYGEN SHOULD RETURN TO NORMAL FLOW AUTOMATICALLY BUT IF MANUAL OVERRIDES HAVE BEEN USED THEY SHOULD BE RESET

IF NORMAL CABIN PRESSURE CANNOT BE RESTORED

CABIN & FLIGHT DECK
TEMPERATURE SELECTORS .... COOLEST AUTO
SETTING E

Set the CABIN and FLIGHT DECK TEMPERATURE SELECTORS TO 0
COOL AUTO

END//

IN ENGLAND

(Unchanged)

SMOKE ON THE FLIGHT DECK

GENERAL

Whenever smoke appears on the Flight Deck take the following precautions BEFORE calling for one of the drills to be carried out:-

(1) Assume that the smoke will get worse.

(2) At least one Pilot and the Flight Engineer should use oxygen masks and smoke goggles immediately.

(3) Engage the autopilot as quickly as possible - if on final approach a go-around should be considered.

(4) Select storm lighting.

(5) Identify the smoke source - this may not be easy, and may take time. Electrical fires usually have a distinctive smell and may be accompanied by tripped circuit breakers. Air conditioning smoke can sometimes be seen coming from the ducts or louvres.

(6) Notify cabin crew - smoke may enter the cabin whilst clearance is under way.

(Unchanged)

AIR CONDITIONING SMOKE

OXYGEN (IF REQ'D) .... ON 100% ALL

If required, all crew members don oxygen masks.
Verify N-100% switch at 100%

CREW COMMUNICATION .... ESTABLISH ALL

On the audio select panel
Rotate the boom/mask rotary selector to MASK

SMOKE GOGGLES (IF REQ'D) .... ON ALL

COND VALVE ....OFF E

Set the COND VALVE selector of the affected group to OFF to confirm the automatic shut down of the affected air conditioning system.

AIR GENERATION SMOKE rty sel .... INHIB E

Set AIR GENERATION SMOKE rotary selector to INHIB to allow restart of the affected group

NOTE

With the AIR GENERATION SMOKE rotary selector at INHIB, if any COND VALVE is switched to OFF then to ON the smoke detection auto shutdown function on that group is inhibited. The AIR GENERATION, SMOKE warning lights on the Flight Engineers right bottom panel and the MWS SMOKE warnings are operative.

WAIT 5 MINUTES
This is to allow smoke to dissipate

THEN
COND VALVE .... ON E

Set the COND VALVE switch of the affected group to ON.

IF SMOKE IS DETECTED
COND VALVE .... OFF E

Set the COND VALVE selector of the affected group to OFF

AIR GENERATION SMOKE rty sel .... NORM E

Set the AIR GENERATION SMOKE rotary selector to NORM to reset the MWS.

APPLY PROCEDURE : SHUT DOWN OF AIR CONDITIONING GROUPS

ELECTRICAL SMOKE OR FIRE

OXYGEN (IF REQ'D) .... ON 100% ALL

If required, all crew members don oxygen masks
Verify N-100% switch at 100%

CREW COMMUNICATION .... ESTABLISH ALL

On the audio select panel
Rotate the boom/mask rotary selector to MASK

SMOKE GOGGLES (IF REQ'D) ....ON ALL

IF SMOKE ORIGIN LOCATED AND CAN BE SAFELY ISOLATED,
OR IF SYSTEM MALFUNCTION OBSERVED
REMOVE RELEVANT POWER SUPPLY

END//

IF SMOKE ORIGIN NOT LOCATED AND FLIGHT DECK OR CABIN VISIBILITY REDUCED

EMERG GEN .... MANUAL
CHECK VOLTS
AND FREQUENCY E

Set the EMERG GEN selector to MANUAL and observe the SELECTED light (blue) on, the AC FREQ/VOLTS rotary selector to EMERG PWR and observe the frequency and volts are normal.

Systems data (emergency generator)

Maximum load	30 KVA (25 KW)
AC frequency	390 to 410 Hz
AC voltage	110 to 118 volts

ENGINE FEED PUMPS .... ALL ON E

Verify all ENGINE FEED PUMPS are selected on since some pumps will be lost when the generators are switched off.

ENGINE RECIRCULATION VALVES .... ALL SHUT E

This ensures maximum fuel flow to the engines while only one fuel pump is operating.

CAUTION
THE ENGINE RECIRCULATION VALVES MUST NOT BE OPENED UNTIL AFTER MAIN GENERATION IS RESTORED.

SERVO CONTROLS YELLOW rty sel .... YELLOW GREEN C

This ensures maximum green hydraulic power availability for the emergency generator.

REAR EXTRACT STANDBY FAN .... ON E

The rear extract standby fan is powered from essential busbars.

F/O ASI AND ALTIMETER .... STANDBY MODE P

Rotate First Officer's ASI and Altimeter mode selectors to S (Standby) in preparation for the loss of ADC No.2

When at S (Standby) the ASI and Altimeter receive information from the nose pitot probe.

ADC 2 .... OFF P

ADC No.2 will be lost with main electrical supply. To prevent the nuisance of spurious over-speed warnings due to circuit design ADC No.2 can be switched off.

AC ESS BUS sws .... ALL EMERG E

Set AC ESS BUS, NORM EMERG switches (4) to EMERG

This confirms that the emergency generator is on and the a.c. essential busbars are locked on to it therefore even if main generation is re-instated, the a.c. essential busbars cannot revert to a.c. main busbars as a power source.

AC essential busbar NORM EMERG switch must only be set to EMERG if the emergency generator is serviceable.

No.2 AC ESS BUS switch, sheds the avionics A busbar 10X and the 26 V a.c. main A busbar 12X
No.3 AC ESS BUS switch, sheds the avionics B busbar 11X and the 26 V a.c. main B busbar 13X.

AIR INTAKE LANE rty sel .... 1 & 3 TO A
2 & 4 TO B E

With the AIR INTAKE LANE rotary selector for intakes No.1 and No.3 at the non-auto A position and intakes No.2 and No.4 at the non-auto B position, the A control lanes of intakes No.1 and No.3 and the B control lanes of intakes No.2 and No.4 are powered from the a.c. essential busbars.

AIR INTAKE HYD sel .... 1 TO GREEN
3 TO BLUE
2 & 4 TO YELLOW E

(Unchanged)

Selecting the INTAKES HYD selectors to GREEN, BLUE or YELLOW selects the appropriate hydraulic system since loss of the d.c. busbars loses the ability to select the standby hydraulic system to intakes 1 & 3 and the main hydraulic system to intakes 2 & 4.

ENGINE CONTROL SCHEDULE .... ABOVE 220 KT HI
BELOW 220 KT LO E

The aircraft speed should be observed and if greater than 220 kt set the ENGINE CONTROL SCHEDULE selector to HI If aircraft speed less than 220 kt set the ENGINE CONTROL SCHEDULE selector to LO.

CAUTION

INS NO.2 AND NO.3 WILL AUTOMATICALLY REVERT TO BATTERY POWER. THEIR LIFE IN NAV MODE IS 15 MINUTES.

GENERATORS ....ALL OFF E

NOTE

Forward rack extract fans are not powered in this condition. Maintain cabin differential above 1 PSI as long as possible.

BATTERY sels .... ESS MAIN SPLIT E

This ensures that the battery is connected to its associated d.c. essential busbar which stays disconnected from the d.c. main busbar.

Subsequent restoration of main generation power will not cause reconnection of d.c. essential busbar to d.c. main busbar.

(Deletion)

THROTTLE MASTERS .... MAIN E

The THROTTLE MASTERS are set to MAIN since all MAIN throttle control lanes are supplied from the a.c. essential busbar.

WING & INTAKE ANTI-ICING .... OFF E

While on emergency generation supply only, the wing and intake anti-icing is not powered but if a main generator is subsequently regained with wing and intake anti-icing selected on, the heavy anti-icing load may put the main generator at risk.

NOTE

Avoid icing conditions as anti-icing is inoperable during flight on emergency electrical power except for the left hand W/S de-ice which is operable at low only and heating for the standby pitot/static probe and ADS 1 sensor.

No.1 & 2 ANTI-STALL .... OFF P

The anti-stall systems are powered from main busbars and are not available during flight on emergency supplies; however they must be selected to OFF to allow the engagement of No.1 AUTOSTAB system.

AUTOSTAB No.1 .... ENGAGE P

Verify AUTOSTAB No.1 switches (3) are engaged

ARTIFICIAL FEEL No.1 .... ENGAGE P

Verify ARTIFICIAL FEEL No.1 switches (3) are engaged. AUTOSTAB No.1 and ARTIFICIAL FEEL No.1 will disconnect when main generation is removed. They can then be re-engaged.

SSB sw .... OPEN E

BTB sels (4) .... TRIP E

WHEN SMOKE, CABIN & FREIGHT HOLD LTS ARE OFF AND/OR SMOKE CLEARED.

RESET MAIN GENERATORS IN TURN TO IDENTIFY THE BUSBAR SUPPLYING THE DEFECTIVE EQUIPMENT. ALLOW APPROXIMATELY 1 MINUTE BETWEEN EACH SELECTION.

WHEN THE DEFECTIVE SUPPLY IS IDENTIFIED

AFFECTED GENERATOR .... OFF E

CAUTION

LEAVE ASSOCIATED BTB TRIPPED.
LEAVE ASSOCIATED AC ESS BUS SWITCH AT EMERG.

SERVICEABLE CHANNELS .... MANUAL PARALLEL E

Apply procedure MANUAL PARALLEL to serviceable channels.

SSB sw ....CLOSE E

AC ESS BUS sw(s)
(SERVICEABLE CHANNELS) .... NORM E

On each serviceable channel set the a.c. essential busbar NORM EMERG switch to NORM.

Some equipment may trip. Reset as required.

▶ IF NO.3 AC MAIN BUS LT ON
AIR INTAKE LANE rty sels .... 2 TO B
3 TO A E

With the AIR INTAKE LANE rotary selector for intake No.3 at the non-auto A position and intake No.2 at the non-auto B position, the A control lanes of intake No.3 and the B control lanes of intake No.2 are powered from the a.c. essential busbars.

▶ IF NO.4 AC MAIN BUS LT ON
AIR INTAKE LANE rty sels .... 1 TO A
4 TO B E

With the AIR INTAKE LANE rotary selector for intake No.1 at the non-auto A position and intake No.4 at the non-auto B position, the A control lanes of intake No.1 and the B control lanes of intake No.4 are powered from the a.c. essential busbars.

BATTERY sels ....BATT ON E

CAUTION
EMERGENCY GENERATOR MUST BE LEFT ON LINE WITH ONE OR MORE A.C. ESSENTIAL BUSBAR NORM EMERG SWITCHES AT EMERG.

(Deletion)

Restore all systems to normal status where possible.

Monitor all systems for correct operation and remove relevant power supply if malfunction observed.

IF EMERGENCY GENERATOR NOT REQUIRED
EMERG GEN .... AUTO E

Set the EMERG GEN selector to AUTO

EMERG GEN NORM/ISOL sw .... ISOL
THEN NORM E

Set the emergency generator NORM/ISOL switch to ISOL for five seconds to switch off the emergency generator then return switch to NORM, observe SELECTED light off.

END//

ON EMERGENCY ELECTRICS

The following are AVAILABLE

Normal pressurisation control
Fuel TOTAL CONTENTS indications and FQIs
FASTEN SEAT BELTS and NO SMOKING signs
Standby horizon
Captain's ADF/RMI
First Officer's VOR/RMI
Voice recorder
Public address
TRK/HDG unit
Marker
Interphone audio selector panels (4)
No. 1 ADC, INS, ADI, Compass Coupler & HSI
No. 1 ADF, VOR, DME, ILS & Radio Altimeter
No. 1 ATC Transponder, VHF & HF

The engine operating schedule will be MID with HI selected and gear up:
it will be LO with any other selection

The following are NOT AVAILABLE

Autopilot
Autothrottle
Normal landing gear operation
Normal visor/nose operation
Visor/nose position indicator
Reverse thrust
Nosewheel steering
Landing lights
Reheat
Normal brakes

EMERGENCY LANDING

ATC TRANSPONDER .... A 7700 P

Rotate the ATC Transponder code selector knob to obtain A7700 on the digital code display.

DISTRESS MESSAGE ....TRANSMIT P

Transmit MAYDAY and advise position, disposition of crew and passengers, intentions on landing, location and description of any dangerous cargo, disposition and quantity of fuel.

CABIN CREW AND PASSENGERS .... BRIEF C

Instruct cabin crew and passengers to prepare for emergency landing and evacuation.

FUEL JETTISON .... AS REQUIRED CE

On Captain's command the Flight Engineer will jettison fuel down to the required quantity. Stop jettisoning before commencing final approach unless performance considerations require maximum weight reduction, in which case set the TANK JETTISON VALVES SWS to SHUT and JETTISON MASTER VALVES sels to OFF by 800 feet above threshold.

HARNESS ....SECURE ALL

CABIN .... DEPRESSURISE BELOW 10,000 FT E

Below 10,000 feet when the cabin altitude and aircraft altitude are approximately the same, set the EMERGENCY DEPRESSURISATION selector to EMERGY DEPRESS.

APPROACH CHECKLIST

EMERGENCY LANDING BRIEFING .... UPDATED C

The Captain will brief on his intentions and requirements for approach, landing and after landing.

F/D DOOR sw .... OPEN E

SEAT BELT SIGNS .... ON E

NO SMOKING SIGNS ....ON E

EMERGENCY LIGHTS	ARM	E
DRAIN MAST HTRS	OFF	E

This ensures that if a drain mast is damaged at impact there is no possibility of the heater circuit acting as a fire ignition source.

ALTIMETERS	SET/CROSS CHECKED	ALL
RADIO ALTIMETERS	DH SET	ALL
ENG RATING MODE	TAKE-OFF	E
RAD/INS sws	RAD	ALL
VISOR	DOWN 5° LT OFF	EP
NOSE	5°	EP
FUEL/WEIGHT/CG	CHECKED	E
TARGET THRESHOLD SPEED	BUGGED	ALL
ENGINE FEED PUMPS	ALL ON	E
FUEL CROSSFEED VALVES	SHUT	E
ENGINE RECIRCULATION VALVES	SHUT	E
APPROACH CHECKLIST	COMPLETED	E

LANDING CHECKLIST

LANDING GEAR	DOWN 4 GREENS	ALL
NOSE	DOWN, GREEN	EP
VISOR STBY CONTROL	VISOR LOWER	P

Setting the STBY control switch to VISOR DOWN will remove the hydraulic pressure from the droop nose jacks and allow the nose to be forced upwards on impact with the runway.

BRAKES	CHECKED/NORM	P
ANTI-SKID	CHECKED	P
SECONDARY AIR DOORS	SHUT	E

BRAKE FANS .... ON E

RADAR .... STANDBY E

YELLOW PUMPS .... ON/PRESSURE NORMAL E

AUX INLET MIs .... OPEN/CROSS-HATCHED E

SEATS .... LOCKED /PWR OFF ALL

LANDING CHECKLIST .... COMPLETED E

AT 1,000 FT - CALL ON PA
"TAKE UP EMERGENCY POSITION" .... P

AT 200 FT - CALL ON PA
"BRACE BRACE" .... P

If PA is unserviceable flash the cabin signs

END//

(Unchanged)

PASSENGER EVACUATION ON LANDING

ADVISE CABIN CREW AND PASSENGERS OF INTENTION TO EVACUATE C

Advise cabin crew and passengers to prepare for evacuation.

NOTIFY CABIN CREW OF ANY CONDITIONS THAT MAY AFFECT EVACUATION C

Notify cabin crew of any existing conditions such as high winds, irregular ground conditions and/or structural damage, areas that could affect deployment or alter status of the escape slides.

TOWER/GROUND CREW .... NOTIFY P

Notify tower and/or ground crew of abnormal airplane condition and of intention to evacuate.

BRAKES LEVER .... PARK C

The brakes are applied with pressure from the brake accumulator.

ENGINE SHUT DOWN HANDLES ....PULL CE

On Captain's command, the Flight Engineer will pull all 4 engine shut down handles and confirm all engines are shut down.

CONTROL COLUMN .... PUSH FULLY FWD AND RELEASE C

Pushing the control column fully forward decays the hydraulic pressure and sets the elevons at the required position for rear slide deployment.

SEVEN SECONDS AFTER PULLING ENGINE SHUT DOWN HANDLES

2 SHOT .... PRESS E

The 2 SHOT extinguishant circuit has greater integrity in a crash situation than the 1 SHOT circuit.

PASSENGER EVACUATION .... INITIATE C

The Captain will direct the cabin crew and passengers to commence evacuation and state which exit doors are to be used.
The EMERG EVAC system may be used in lieu of, or in addition to the PA announcement

MISCELLANEOUS

BATTERY sels ....BATT OFF E

Set the BATTERY selectors to BATT OFF when electrical power is no longer required.

CAUTION
AT LEAST 10 SECONDS MUST ELAPSE BETWEEN PULLING THE ENGINE SHUT DOWN HANDLES AND SWITCHING OFF THE BATTERIES TO ALLOW THE LP FUEL VALVES TO SHUT.

EVACUATION .... EVACUATE AIRCRAFT ASSIST CABIN CREW ALL

Leave the aircraft via the forward slides and control, passenger movement away from the aircraft vicinity, unless conditions in the cabin dictate their carrying out the duties of any of the cabin crew.

END//

NOTE
If neither of the forward slides are available at least one flight crew member is to use the forward vestibule escape rope and align any retrievable slides.

(Deletion)

DITCHING

ATC TRANSPONDER .... A 7700 P

Rotate the ATC Transponder Code selector knob to obtain A7700 on the digital code display.

DISTRESS MESSAGE ....TRANSMIT P

Transmit MAYDAY and advise positions, disposition of crew and passengers, intentions on landing, location and description of any dangerous cargo, disposition and quantity of fuel.

CABIN CREW AND PASSENGERS .... BRIEF P

Instruct cabin crew and passengers to prepare for ditching and evacuation.
All crew, don life jackets, uninflated, at the earliest opportunity.

FUEL JETTISON .... AS REQUIRED CE

On Captain's command the Flight Engineer will jettison fuel down to the required quantity. Stop jettisoning before commencing final approach unless performance considerations require maximum weight reduction, in which case set the TANK JETTISON VALVES sws to SHUT and JETTISON MASTER VALVES sels to OFF by 800 ft above sea level.

GPW C/B .... TRIP E
L/GEAR WARN C/B .... TRIP E

CIRCUIT BREAKER	PANEL	GRID REF
GROUND PROXIMITY WARN AC SUP	13-215	G4
AUDIO WARN SYS SUP 1	1-213	M21

AT 180 KNOTS

AUDIO .... CANCEL E

NOTE

With the GPW circuit breaker tripped all modes of operation of the ground proximity system will be inhibited.

With the L/GEAR WARN circuit breaker tripped the audio will operate at 180 knots.

HARNESS	SECURE	ALL
DISCHARGE VALVES sws (2)	NORMAL	E
CABIN	DEPRESSURISE BELOW 10,000 FT	E

Below 10,000 ft, when the cabin altitude and aircraft altitude are approximately the same, set the emergency depressurisation selector to EMERGY DEPRESS.

APPROACH CHECKLIST

DITCHING BRIEFING	UPDATED	C

The Captain will brief on his intentions and requirements for approach, ditching and after ditching

F/D DOOR sw	OPEN	E
SEAT BELT SIGNS	ON	E
NO SMOKING SIGNS	ON	E
EMERGENCY LIGHTS	ARM	E
ALTIMETERS	SET/CROSS CHECKED	ALL
RADIO ALTIMETERS	DH SET	ALL
ENG RATING MODE	TAKE-OFF	E
RAD/INS sws	RAD	ALL
CG	53.5%	E

Control fuel disposition to maintain authorised maximum rearward CG (53.5% Co)

TARGET THRESHOLD SPEED	BUGGED	ALL
ENGINE FEED PUMPS	ALL ON	E

FUEL CROSSFEED VALVES .... SHUT E

ENGINE RECIRCULATION VALVES .... SHUT E

APPROACH CHECKLIST .... COMPLETED E

LANDING CHECKLIST

LANDING GEAR .... UP ALL

NOSE .... UP ALL

VISOR .... UP ALL

RAMP/SPILL MASTERS .... MAN E

RAMPS .... 0% E

BLEED VALVES .... SHUT E

DITCHING VALVES .... SHUT E

SEATS .... LOCKED /PWR OFF ALL

LANDING CHECKLIST .... COMPLETED E

AT 1,000 FT - CALL ON PA
"TAKE UP DITCHING POSITION" .... P

APPROACH FOR TOUCHDOWN

ON LEAVING 1,000 FT ALTITUDE

AUTOPILOT .... ENGAGED C

AUTOTHROTTLE .... ENGAGED C

APPROACH SPEED .... VREF C

RATE OF DESCENT.................................... 300 FT/MIN C

Hold speed and glide slope using autothrottle and autopilot.

AT 200 FT - CALL ON PA
"BRACE BRACE" .... P

If PA is unserviceable flash the cabin signs.

AT 50 FT

AUTOTHROTTLE .... DISENGAGE MAINTAIN EXISTING POWER SETTINGS   C

REDUCE RATE OF DESCENT FOR TOUCHDOWN AT A PITCH ATTITUDE OF APPROXIMATELY 15°

ON TOUCHDOWN

ENGINE SHUTDOWN HANDLES ....PULL   CE

On Captain's command, the Flight Engineer will pull all (4) engine shut down handles and confirm all engines are shut down.

HOLD PITCH ATTITUDE AS LONG AS POSSIBLE

PASSENGER EVACUATION ....INITIATE   C

The Captain will direct the cabin crew and passengers to commence evacuation and state which exit doors are to be used.
The EMERG EVAC system may be used in lieu of, or in addition to the PA announcement.

EVACUATION ....EVACUATE AIRCRAFT ASSIST CABIN CREW   ALL

Leave the aircraft via the most convenient door, joining with the cabin crew to ensure at least one crew member per raft or slide raft.

END//

NOTE

If flight crew access to forward doors is impeded, the escape rope stowed in the side console is to be used for evacuation via the sliding window.

NOTE

Disconnection of autopilot during the approach for touchdown is left to the discretion of the pilot.

(Unchanged)

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GROUND PROXIMITY PULL-UP WARNING

CALL	"PULL-UP WARNING"	P
AUTOPILOT	DISCONNECT	C
FULL POWER	APPLY	E

Immediately apply full dry power, together with reheat and contingency as required.

ATTITUDE	ADJUST	C

Departure

Check and adjust pitch attitude to achieve a minimum speed of V_2+40 kts in level flight before initiating a climb. Level the wings where possible.

En-route and Arrival

Check and adjust pitch attitude to a minimum of 15° and climb away at not less than VREF + 50 kts. Level the wings where possible.

CAUTION.

In either case:

1. **DO NOT DISREGARD SHORT DURATION WARNING - TAKE IMMEDIATE ACTION.**
2. **AFTER WARNING CEASES**
   - (a) **CHECK AIRCRAFT POSITION**
   - (b) **CHECK RADIO AND PRESSURE ALTIMETERS**
   - (c) **CHECK ALTIMETER SETTINGS**
   - (d) **DETERMINE MINIMUM SAFE ALTITUDE**

END//

TYPES OF CRASH LANDING

GENERAL

Emergencies develop in two forms:-

UNPREMEDITATED:-	Those that take place without warning e.g. take-off or landing.
PREMEDITATED:-	Those where there is ample warning to preplan the evacuations.

When an accident occurs, the most vital factor is TIME. Consequently crews must know their drills and equipment thoroughly so no time is lost.

Any landing involving fire risks or tearing of the a/c structure should necessitate immediate evacuation of passengers after coming to rest. Cabin crew will always be alerted as soon as possible. The nature of the emergency drill determines the actions required.

It is possible, in certain emergencies due to undercarriage failure, for the aircraft to rest on a wingtip, to tip up on its tail or nose - extreme caution should be exercised to ensure that slides reach the ground and are safe for passenger evacuation.

Cabin lighting should be dimmed for night landing to allow the passengers eyes to adjust to night conditions.

UNPREMEDITATED

This is the most critical case, and its success will depend entirely on the competency of the crew.

The Captain will order, over the P.A. or through the Senior Cabin Crew Member, an immediate evacuation, indicating, if conditions so require, the doors or side of aircraft that should be used.

PREMEDITATED

Action will be initiated by Captain calling "Prepare for Crash Landing".

Passengers should remain in their seats and take up their bracing attitudes on command of "Brace, Brace" or flashing of cabin signs.

Supernumerary crew members should take up passenger seats where available, otherwise their normal take-off and landing stations

Co-pilot will call take up crash landing position on the P.A. at 1000 ft. At approx. 200 ft., the Co-pilot will call "Brace, Brace" on public address system, or flash the cabin signs. Doors must not be operated until the aircraft has come to rest.

The Captain will order, over the P.A. or through the Senior Cabin Crew member immediate evacuation, indicating, if conditions so require, the doors or side of aircraft to be used.

DUTIES BEFORE CRASH LANDING

AIR CABIN CREW WILL:-

Acknowledge the order "Prepare for Crash Landing".

The Senior Cabin Crew member will ensure:-

Cabin crew fully briefed on their duties,
Precautions listed in the emergency announcement carried out, including full passenger briefing with maximum cabin lighting.

The cabin crew will:-

Secure all loose hand-baggage and equipment.

Secure galley equipment and switch off galley electrics.

Distribute blankets and pillows.

Re-position passengers and seat able-bodied people next to:-

Invalids
Unstable people
Children
Old people

Check that:-

Seats are in the upright position.

High-heeled shoes are removed.

Seat belts are secured.

Ties and collars are loosened.

Spectacles and dentures are removed.

All sharp objects are removed from person (i.e. pens, pencils)

The bracing Position is understood.

Cabin lighting to DIM.

The Senior Cabin Crew member will report to the Captain

"CABIN PREPARATION COMPLETE"

Cabin crew will take up crash-landing positions.

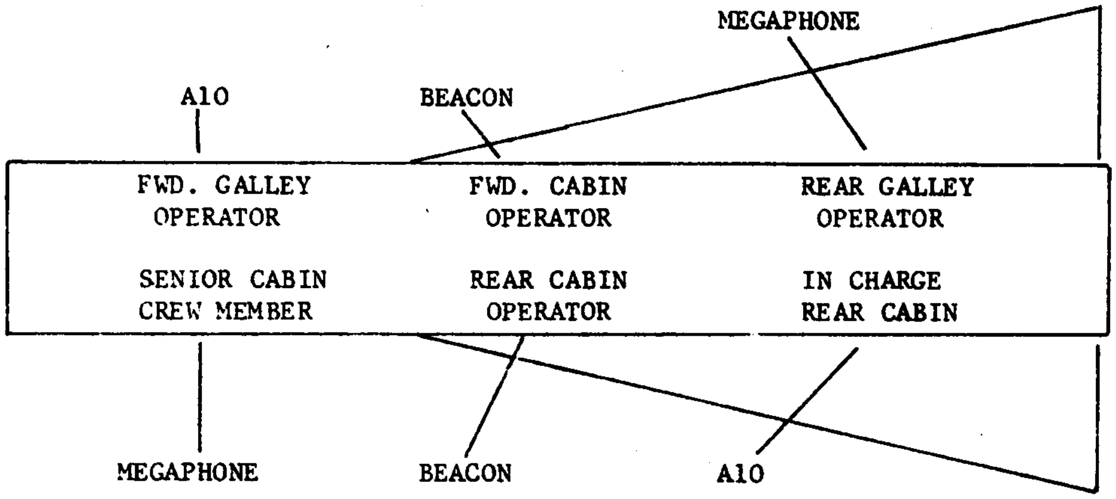
Doors must not be operated until after the aircraft has come to rest.

DUTIES AFTER CRASH LANDING

1. Operate only doors not affected by fire or other hazard.
2. Direct passengers through available doors, by standing to the side of the doorway so that none of the available exit area is blocked. Make physical and/or verbal contact with the approaching passengers, as far back in the vestibule area as possible. Use whatever physical force is necessary to keep the passengers moving.
3. At the Slide:-
   - (a) Call "JUMP - JUMP - JUMP"; except at centre and rear doors which have ramps therefore instruct passengers to "WALK TO SLIDE AND JUMP".
   - (b) When assisting passengers through the doorways, all physical contact should be kept below shoulder level, preferable in the small of the back or even lower. If passengers sit down, do not bend down to them but use your foot or knee in their backs to tip them on to the slide. Passengers can, if necessary, be pushed out in any position.

   - (c) Order four able bodied passengers to wait at the bottom of the slide, to help passengers to their feet, and away from the aircraft.
4. Check your cabin area is clear of passengers, then leave via the nearest available door. When on the ground, assist with the marshalling of passengers away from the aircraft.

CRASH LANDING POSITIONS AND EQUIPMENT RESPONSIBILITIES



CRASH LANDING DRILL

SENIOR CABIN CREW MEMBER

FWD LH door

1. Acknowledge.
2. Full Cabin Lighting.
3. Brief Cabin Crew.
4. Brief Passengers and Supervise Cabin Preparation.
5. Galley Equipment 'OFF'.
6. Cabin Dividers 'OPEN'.
7. Doorways Clear.
8. Passenger and Cabin Preparation Complete.
9. Lighting controls to 'DIM'.
10. Check Emergency Lights 'ON'.
11. Report to Captain "All preparations complete".
12. Adopt landing position.

AFTER LANDING

CHECK AVENUE OF ESCAPE IS SATISFACTORY

DOOR USABLE	DOOR NOT IN USE
1. Check emergency lights 'ON'	1. Check emergency lights 'ON'
2. Operate door.	2. Guard door.
3. Evacuate passengers.	3. Direct passengers to nearest useable exit.
4. Check cabin area clear.	4. Check cabin area clear.
5. Leave by any door.	5. Leave by any door.
6. Direct passengers away from aircraft.	6. Direct passengers away from aircraft.

CRASH LANDING DRILL

CREW MEMBERS

ALL OTHER DOORS

1. Acknowledge
2. Secure cabin area and passengers.
3. Cabin Dividers "OPEN"
4. Doorways Clear
5. Report to SENIOR CABIN CREW MEMBER "All preparations complete".
6. Adopt landing position

AFTER LANDING

CHECK AVENUE OF ESCAPE IS SATISFACTORY

DOOR USABLE	DOOR NOT IN USE
1. Operate door.	1. Guard door.
2. Evacuate passengers.	2. Direct passengers to nearest useable exit.
3. Check cabin area clear.	3. Check cabin area clear.
4. Leave by any door.	4. Leave by any door.
5. Direct passengers away from aircraft.	5. Direct passengers away from aircraft.

TEMPORARY REVISION
Insert facing 02-14 page 57

REASON FOR ISSUE:

To amend the Forward LH Door Logic to include reference to Manual Unlocking Straps on a particular batch of Forward LH Door Slidepacks.

The following information is applicable to the Forward LH Door only and is supplementary to the drill opposite.

There is a remote possibility that a particular batch of Forward LH door Slidepacks may exhibit the following fault:-

> Upon opening the door in the "Armed" condition the slide pack will release from the door, but the slide container may not open, thus inhibiting the automatic deployment/inflation sequence.

Until these slidepacks can be modified they are each fitted with two Manual Unlocking Straps. Pulling the Straps will open the container and permit normal deployment/inflation to continue.

Therefore, in the event of a Forward LH Door Slide failing in the manner described above:-

1. Locate the two red Manual Unlocking Straps.
2. Before pulling these straps be aware that a successful manual release will be indicated by the front cover of the slide container moving rapidly upwards and outwards, therefore take up an appropriate position.
3. Pull each Manual Unlocking Strap sharply in turn.

   NOTE: (a) The strap movement will be small - one to two inches.

   (b) the slide may well deploy after pulling the first strap.
4. Following successful manual release of the slide container revert to standard drills and Procedures.

DOOR LOGIC

EXPANDED DRILLS

FWD LH door & FWD RH door
Centre LH door & Centre RH door

PASSENGER EVACUATION AFTER EMERGENCY LANDING OR GROUND EMERGENCY

ESCAPE SLIDE LEVER - CHECK IN FWD. ARM POSITION.

DOOR - FWD DOORS - CHECK THROUGH VIEWING WINDOW.
CENTRE DOORS - CHECK THROUGH ADJACENT WINDOW THAT ESCAPE ROUTE CLEAR

◆ IF ESCAPE ROUTE CHECK UNSATISFACTORY

- DO NOT USE

IF ESCAPE ROUTE CHECK SATISFACTORY

DOOR - OPEN - SLIDE DEPLOYS AND INFLATES AUTOMATICALLY.

◆ IF SLIDE DOES NOT DEPLOY

MANUAL SLIDE PACK RELEASE LEVER - OPERATE.

  ◆ IF SLIDE STILL DOES NOT DEPLOY

  DO NOT USE EXIT

◆ IF SLIDE DEPLOYS BUT DOES NOT INFLATE

RED MANUAL INFLATION HANDLE - PULL

  ◆ IF SLIDE STILL DOES NOT INFLATE.

  DO NOT USE EXIT

WHEN SLIDE DEPLOYS AND INFLATES CORRECTLY

PASSENGERS AND CREW - EVACUATE

DOOR LOGIC

EXPANDED DRILLS

Rear LH door & Rear RH door

PASSENGER EVACUATION AFTER EMERGENCY LANDING OR GROUND EMERGENCY

ESCAPE SLIDE LEVER - CHECK IN FWD. ARM POSITION.

DOOR - PARTIALLY OPEN AND CHECK ESCAPE ROUTE SAFE.

- ◆ IF ESCAPE ROUTE CHECK UNSATISFACTORY
  SHUT DOOR - DO NOT USE.

IF ESCAPE ROUTE CHECK SATISFACTORY
DOOR - OPEN - SLIDE DEPLOYS AND INFLATES AUTOMATICALLY.

- ◆ IF PACK DOES NOT DEPLOY
  DO NOT USE EXIT
- ◆ IF WALKWAY DEPLOYS BUT DOES NOT INFLATE.
  RED MANUAL INFLATION HANDLE - PULL
  - ◆ IF WALKWAY STILL DOES NOT INFLATE.
    DO NOT USE EXIT
- ◆ IF OFFWING SLIDE DEPLOYS BUT DOES NOT INFLATE.
  SECOND RED MANUAL INFLATION HANDLE - PULL
  - ◆ IF OFFWING SLIDE DOES NOT INFLATE
    DO NOT USE EXIT

WHEN SLIDE DEPLOYS AND INFLATES CORRECTLY
PASSENGERS AND CREW - EVACUATE

CRASH LANDING DRILL

SPECIAL FLIGHTS (E.G. TRAINING/DELIVERY)

Forward Cabin in use only. Maximum number on board 16 - Senior Cabin Crew Member Fwd. LH door.

1. Acknowledge.
2. Full Cabin Lighting.
3. Brief Passengers and Prepare Cabin
4. Galley Equipment 'OFF'.
5. Cabin Dividers 'OPEN'.
6. Doorways Clear.
7. Passenger and Cabin Preparation Complete.
8. Lighting controls to 'DIM'.
9. Check Emergency Lights 'ON'.
10. Report to Captain "All preparations complete".
11. Adopt landing position.

AFTER LANDING

CHECK AVENUE OF ESCAPE IS SATISFACTORY

DOOR USABLE	DOOR NOT IN USE
1. Check emergency lights 'ON'.	1. Check emergency lights 'ON'.
2. Operate door.	2. Guard door.
3. Evacuate passengers.	3. Direct passengers to nearest useable exit.
4. Check cabin area clear.	4. Check cabin area clear.
5. Leave by any door.	5. Leave by any door.
6. Direct passengers away from aircraft.	6. Direct passengers away from aircraft.

TYPES OF DITCHING

GENERAL

Emergencies develop in two forms.

UNPREMEDITATED:- Those that take place without warning e.g. take-off or landing.

PREMEDITATED:- Those where there is ample warning to pre-plan the evacuation.

When an accident occurs, the most vital factor is TIME. Consequently crews must know their drills and equipment so that no time is lost.

Check door is in the armed position. The doors must not be operated until the aircraft has come to rest.

Cabin lighting should be dimmed for night landing to allow the passengers eyes to adjust to night conditions.

UNPREMEDITATED

This is a most critical case and is only likely to occur at airfields close to water e.g. Hong Kong.

The Captain will order over the P.A. or through the Purser that lifejackets be put on, liferaft and sliderafts launched and an immediate evacuation commenced, indicating, if conditions so require, the doors or side of aircraft to be used.

PREMEDITATED

Action will be initiated by the Captain calling "Prepare for ditching"

Passengers should put on their lifejackets, fasten their seat belts and be prepared to take up their bracing attitudes on command of "Brace, Brace", or flashing of cabin signs.

Supernumerary crew members should take up passenger seats where available, otherwise their normal take-off and landing stations.

Co-Pilot will call "Take up ditching position" on the P.A. at 1000 ft. At approximately 200 ft, the co-pilot will call "Brace, Brace" on public address system, or flash the cabin signs. Doors must not be operated until the aircraft has come to rest.

The captain will order evacuation to commence, indicating, if conditions so require, the doors or side of aircraft to be used.

DITCHING DUTIES

ALL CABIN CREW WILL

Acknowledge the order, "PREPARE FOR DITCHING".

The Senior Cabin Crew member will ensure:-

Cabin crew fully briefed on their duties.
Precautions listed in the emergency announcement carried out.
Full passenger briefing with maximum cabin lighting.

Cabin Crew will:-

Secure all loose hand-baggage and equipment.
Secure galley equipment and switch off galley electrics.
Fit lifejackets to small children.
Distribute blankets and pillows.

Reposition passengers and seat able-bodied people next to:-

Invalids
Unstable people
Children
Old people

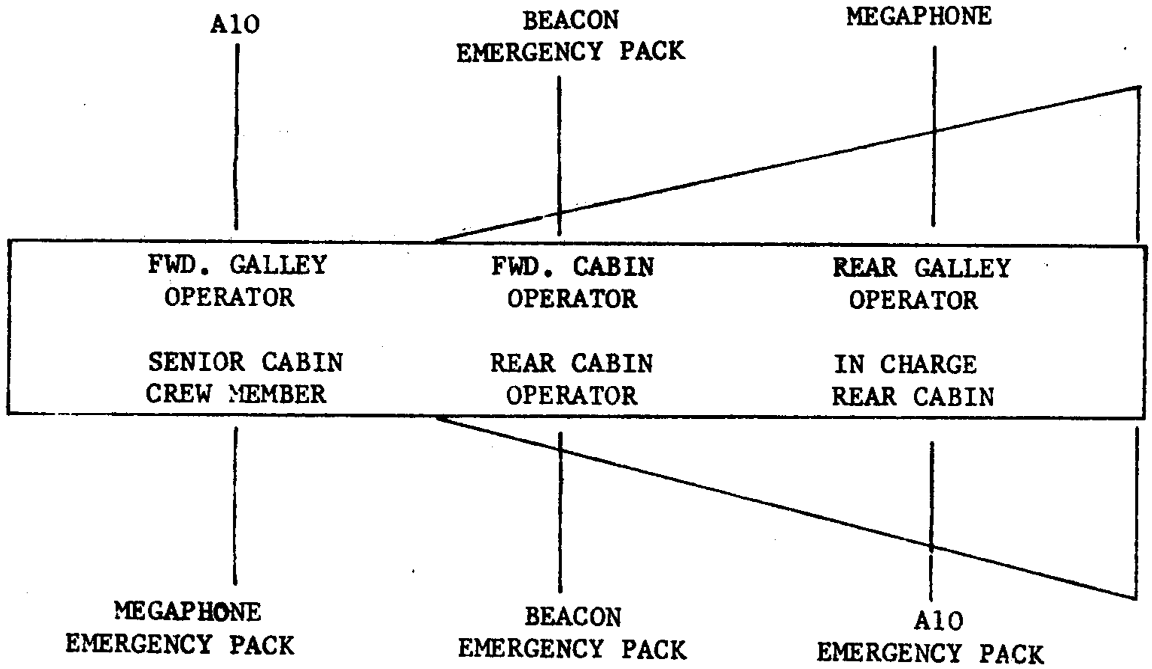
Check that:-

Lifejackets fit correctly.
Seats are in the upright position.
High-heeled shoes are removed.
Seat belts are secured.
Ties and collars are loosened.
Spectacles and dentures are removed.
All sharp objects are removed from person (i.e. pens, pencils).
The Bracing Position is understood.
Cabin lighting to DIM.

The Senior Cabin Crew member will report to the Captain "CABIN PREPARATION IS COMPLETE".

Cabin crew will take up ditching stations.

DITCHING POSITIONS AND EQUIPMENT RESPONSIBILITIES



DITCHING DRILL

SENIOR CABIN CREW MEMBER

FWD LH door

1. Acknowledge.
2. Full cabin lighting.
3. Brief Cabin Crew.
4. Brief passengers and supervise cabin preparation
5. Loosen Tie and Collar
6. Fit Lifejacket
7. Galley Equipment Off
8. Select and brief passengers to assist
9. Cabin Dividers 'OPEN'
10. Doorways Clear
11. Passenger and Cabin Preparation Complete
12. Lighting Controls to 'DIM'.
13. Check Emergency Lights 'ON'
14. Report to Captain "All preparations complete"
15. Adopt landing position.

AFTER DITCHING

CHECK AVENUE OF ESCAPE IS SATISFACTORY

DOOR USABLE	DOOR NOT IN USE
1. Check emergency lights 'ON	1. Check emergency lights 'ON'
2. Open door.	2. Guard door.
3. Attach mooring line.	3. Direct passengers to centre doorways.
4. Convert slide to raft.	4. Detach raft from door and reposition to centre doorways.
5. Launch raft by detach handle.	5. Attach and launch raft.
6. Control Evacuation.	6. Control evacuation.
7. Check cabin area clear.	7. Check cabin clear.
8. Command a liferaft.	8. Leave by any door.
	9. Command a liferaft.

DITCHING DRILL

FWD RH Door

1. Acknowledge
2. Cabin Dividers "OPEN"
3. Loosen tie and collar
4. Fit lifejacket
5. Assist with cabin preparation
6. Adopt landing position

AFTER DITCHING

CHECK AVENUE OF ESCAPE IS SATISFACTORY

Assist as required

DITCHING DRILL

Centre LH door & Centre RH door

1. Acknowledge
2. Full Cabin Lighting
3. Cabin Dividers 'OPEN'
4. Doorways Clear
5. Loosen tie and collar.
6. Fit Lifejacket.
7. Select and Brief passengers to assist.
8. Secure cabin area and passengers.
9. Lighting Controls to 'DIM'.
10. Report to SENIOR CABIN CREW MEMBER "All preparations complete".
11. Adopt landing position.

AFTER DITCHING

CHECK AVENUE OF ESCAPE IS SATISFACTORY

DOOR USABLE

1. Open door.
2. Attach mooring line.
3. Convert slide to raft.
4. Launch raft by detach handle.
5. Control Evacuation.
6. Check cabin area clear.
7. Command a liferatt.

DOOR NOT IN USE

1. Guard door.
2. Direct passengers to nearest useable door.
3. Check cabin area clear.
4. Leave by any door.
5. Command a liferaft.

DITCHING DRILL

Rear LH Door

1. Acknowledge
2. Full Cabin Lighting
3. Cabin dividers 'OPEN'
4. Doorways Clear
5. Loosen tie and collar
6. Fit lifejacket.
7. Select and brief passengers to assist.
8. Secure cabin area and passengers.
9. Lighting controls to 'DIM'.
10. Report to SENIOR CABIN CREW MEMBER "All preparations complete".
11. Adopt landing position.

AFTER DITCHING

CHECK AVENUE OF ESCAPE IS SATISFACTORY

DOWNWIND

DOOR IN USE

1. Open door.
2. If slide deploys
3. Drag raft to exit.
4. Attach mooring line
5. Remove walkway curtain.
6. Throw out raft.
7. Pull mooring line to inflate.
8. Control evacuation.
9. Check cabin area clear.
10. Command a liferaft.

2. If slide does not deploy open door to full extent.
3. Drag Raft to Exit
4. Attach Mooring Line
5. Throw out Raft
6. Pull Mooring Line to Inflate
7. Control Evacuation
8. Check Cabin Area Cler
9. Command a Liferaft

DOOR NOT IN USE

1. Guard door
2. Direct passengers to nearest useable exit.
3. Check cabin area clear
4. Leave by any door
5. Command a liferaft

DITCHING DRILL

Rear RH Door

1. Acknowledge
2. Cabin Dividers "OPEN"
3. Loosen tie and collar
4. Fit Lifejacket
5. Assist with cabin preparation
6. Adopt landing position

AFTER DITCHING

Assist as required.

If a slide/raft is unserviceable and a second 36 seater raft is carried.

AFTER DITCHING

CHECK AVENUE OF ESCAPE IS SATISFACTORY

DOOR IN USE

1. Open door
2. If slide deploys
3. Drag raft to exit
4. Attach mooring line
5. Remove walkway curtain
6. Throw out raft
7. Pull mooring line to inflate
8. Control evacuation
9. Check cabin area clear
10. Command a liferaft

2. If slide does not deploy open door to full extent
3. Drag raft to exit
4. Attach mooring line
5. Throw out raft
6. Pull mooring line to inflate
7. Control evacuation
8. Check cabin area ckear
9. Command a liferaft.

DOOR NOT IN USE

1. Guard door
2. Direct passengers to nearest useable exit
3. Check cabin area clear
4. Leave by any door
5. Command a liferaft

DOOR LOGIC

EXPANDED DRILLS

Rear LH door

PASSENGER EVACUATION AFTER DITCHING

DOWNWIND SIDE DOOR

ESCAPE SLIDE LEVER - CHECK IN FWD 'ARM' POSITION

DOOR OPEN SLIDE DEPLOYS AND INFLATES AUTOMATICALLY.

◆ IF SLIDE DOES NOT DEPLOY

TO ENSURE SUFFICIENT CLEARANCE
TO LAUNCH LIFERAFT, PUSH YELLOW LEVER
TO OPEN DOOR TO FULL EXTENT.

DOOR LOGIC

EXPANDED DRILLS

FWD LH door

PASSENGER EVACUATION AFTER DITCHING

ESCAPE SLIDE LEVER - CHECK IN FWD. ARM POSITION
DOOR - CHECK THROUGH VIEWING WINDOW THAT ESCAPE ROUTE CLEAR.

◆ IF ESCAPE ROUTE CHECK UNSATISFACTORY

- DO NOT USE BUT RAFT CAN BE MANUALLY LAUNCHED THROUGH EITHER OF THE CENTRE DOORWAYS.

IF ESCAPE ROUTE CHECK SATISFACTORY

DOOR - OPEN SLIDE/RAFT DEPLOYS AND INFLATES AUTOMATICALLY.

◆ IF DOOR FAILS TO OPEN

RAFT CAN BE MANUALLY LAUNCHED THROUGH CENTRE DOORWAYS.

◆ IF SLIDE/RAFT DOES NOT DEPLOY

MANUAL SLIDE/RAFT PACK RELEASE LEVER - OPERATE

◆ IF SLIDE/RAFT STILL DOES NOT DEPLOY

DO NOT USE EXIT.

◆ IF SLIDE/RAFT DEPLOYS BUT DOES NOT INFLATE

RED MANUAL INFLATION HANDLE - PULL

◆ IF SLIDE/RAFT STILL DOES NOT INFLATE

DO NOT USE EXIT.

TEMPORARY REVISION
Insert facing 02-14 page 70

REASON FOR ISSUE:

To amend the Forward LH Door Logic to include reference to Manual Unlocking Straps on a particular batch of Forward LH Door Slidepacks.

The following information is applicable to the Forward LH Door only and is supplementary to the drill opposite.

There is a remote possibility that a particular batch of Forward LH door Slidepacks may exhibit the following fault:-

Upon opening the door in the "Armed" condition the slide pack will release from the door, but the slide container may not open, thus inhibiting the automatic deployment/inflation sequence.

Until these slidepacks can be modified they are each fitted with two Manual Unlocking Straps. Pulling the Straps will open the container and permit normal deployment/inflation to continue.

Therefore, in the event of a Forward LH Door Slide failing in the manner described above:-

1. Locate the two red Manual Unlocking Straps.
2. Before pulling these straps be aware that a successful manual release will be indicated by the front cover of the slide container moving rapidly upwards and outwards, therefore take up an appropriate position.
3. Pull each Manual Unlocking Strap sharply in turn.

   NOTE: (a) The strap movement will be small - one to two inches.

   (b) the slide may well deploy after pulling the first strap.
4. Following successful manual release of the slide container revert to standard drills and Procedures.

DOOR LOGIC

EXPANDED DRILLS

Centre LH door & Centre RH door

PASSENGER EVACUATION AFTER DITCHING

ESCAPE SLIDE LEVER - CHECK IN FWD. ARM POSITION
DOOR - CHECK THROUGH ADJACENT WINDOW THAT ESCAPE ROUTE CLEAR

◆ IF ESCAPE ROUTE CHECK UNSATISFACTORY

DO NOT USE.

IF ESCAPE ROUTE CHECK SATISFACTORY

DOOR - OPEN SLIDE/RAFT DEPLOYS AND INFLATES AUTOMATICALLY.

◆ IF SLIDE/RAFT DOES NOT DEPLOY

MANUAL SLIDE/RAFT PACK RELEASE LEVER - OPERATE

◆ IF SLIDE/RAFT STILL DOES NOT DEPLOY

DO NOT USE EXIT.

◆ IF SLIDE/RAFT DEPLOYS BUT DOES NOT INFLATE

RED MANUAL INFLATION HANDLE - PULL

◆ IF SLIDE STILL DOES NOT INFLATE

DO NOT USE EXIT.

DITCHING DRILL

SPECIAL FLIGHTS (E.G. TRAINING/DELIVERY)

Forward Cabin in use only. Maximum number on board - 16. Senior Cabin Crew Member Fwd. LH door.

1. Acknowledge.
2. Full cabin lighting.
3. Brief passengers and prepare cabin
4. Loosen Tie and Collar
5. Fit Lifejacket
6. Galley Equipment Off
7. Select and brief passengers to assist
8. Cabin Dividers 'OPEN'
9. Doorways Clear
10. Passenger and Cabin Preparation Complete
11. Lighting Controls to 'DIM'.
12. Check Emergency Lights 'ON'
13. Report to Captain "All preparations complete"
14. Adopt landing postion.

AFTER DITCHING

CHECK AVENUE OF ESCAPE IS SATISFACTORY

DOOR USABLE

1. Check emergency lights 'ON'.
2. Open door.
3. Attach mooring line.
4. Convert slide to raft.
5. Launch raft by detach handle.
6. Control Evacuation.
7. Check cabin area clear.
8. Command a liferaft.

DOOR NOT IN USE

1. Check emergency lights 'ON'.
2. Guard door.
3. Direct passengers to centre doorways.
4. Open door.
5. Attach mooring line.
6. Convert slide to raft.
7. Launch raft by detach handle.
8. Control evacuation.
9. Check cabin clear.
10. Leave by any door.
11. Command a liferaft.

LIST OF CONTENTS

ABNORMAL PROCEDURES

POWER PLANT

Precautionary engine shut down 03.01.01
Throt light on 03.01.03
Engine flame out 03.01.04
Auto ignition relight 03.01.05
Engine in flight start 03.01.06
Engine high oil temp light on 03.01.09
Reheat light on 03.01.12
Reheat fails to cancel 03.01.15
EGT instrument light on 03.01.16
Intake hyd light on 03.01.17
Intake light on 03.01.18

Aux inlet MI fails to read open 03.01.23
Intake incidence signal failure light on 03.01.24
Intake N_1 sig and/or lane light on 03.01.25
N_1 reduce light on 03.01.26
Fuel filter light on 03.01.27
Engine inlet low press light on 03.01.28
High fuel temp light on 03.01.29
Engine anti-icing malfunction 03.01.31
Nozzle light on not associated with ADC failure 03.01.32
Engine vibration amber warning light on 03.01.35
Continuous engine surge above M = 1.3 03.01.37
Continuous engine surge at or below M = 1.3 03.01.41
Engine malfunction not associated with throt light on 03.01.43
Con light on 03.01.46
Engine failure at or after VI in the take-off phase of flight 03.01.48
Engine overspeed 03.01.50
Incorrect secondary nozzle position (within normal forward thrust range) 03.01.51
Secondary air doors fail to open after take-off 03.01.53
High oil cont light on 03.01.54
False start 03.01.55
Inadvertent reverse thrust) 03.01.57
Inadvertent forward thrust)not expanded 03.01.57
Aux inlet MI fails to read shut) 03.01.57

(Unchanged)

LIST OF CONTENTS

"ABNORMAL PROCEDURES"

FUEL SYSTEM

Fuel jettison 03.02.01
Tank press light on 03.02.04
Management with abnormally low fuel quantity 03.02.06
Failure of tank 1 & 4 norm mode 03.02.08
Failure of tank 5 or 7 pumps 03.02.09
Failure of tank 6 or 8 pumps 03.02.11
Failure of tank 9 pump 03.02.12
Abnormal CG position 03.02.15
Failure of tank 5A or 7A pump 03.02.18
Failure of tank 10 pump 03.02.19
Failure of tank 11 pump 03.02.21
O/FULL light on 03.02.22
ACC light on 03.02.24
Failure of an engine feed pump 03.02.25
FQI/CG abnormal indications 03.02.26
Total loss of CG data with trim tank)
FQI serviceable) not 03.02.29
Total loss of CG data with one trim tank) expanded
FQI unserviceable) 03.02.29

FLIGHT CONTROLS

Loss of both electric trim systems 03.03.01
Total loss of artificial feel in one axis 03.03.01
Total loss of autostabilization in one axis 03.03.01
Loss of control of one inner elevon 03.03.01
Mech jam light on 03.03.01
Flying control inverter failure 03.03.01
Flying control signalling mode change 03.03.01
Loss of anti-stall system(s) 03.03.02
Loss of one autostabilization system 03.03.03
Loss of one artificial feel system or one artificial feel jack 03.03.04
Relay jack blue jam or green jam 03.03.05

HYDRAULIC POWER

Hydraulic tank low level 03.04.01
Yellow hyd fluid o/heat and/or o/press 03.04.04
Blue/green hyd fluid o/heat and/or o/press 03.04.06
Hydraulic pump low pressure 03.04.08
Reservoir l/press light on 03.04.09

NAVIGATION SYSTEM

ADC Failure 03.05.01
Failure of Carousel INS 03.05.03
Navigation system abnormal indications 03.05.05

LIST OF CONTENTS

ABNORMAL PROCEDURES

ELECTRICAL

AC main bus light on 03.06.01
AC ess bus lights on 03.06.07
Emerg gen o/heat light on 03.06.08
Emerg gen fail light on 03.06.09
Failure of one or two generators 03.06.10
DC ess bus light on 03.06.11
DC main bus light on 03.06.12
CSD light on 03.06.13
CSD oil inlet temperature light on 03.06.14
CSD high differential temperature 03.06.15
Batt isolate light on 03.06.16
TRU overheat light on 03.06.17
Generator fails to parallel 03.06.18
Manual parallel 03.06.20

LANDING GEAR

Landing gear standby lowering 03.07.01
Main gear free fall 03.07.02
Nose gear free fall 03.07.05
Wheels o/heat light on in flight 03.07.08
Use of brakes in emerg 03.07.10
L/G abnormal ind. after up select 03.07.12
Upper locks light on in flight 03.07.13
Loss of nosewheel steering 03.07.14
High Energy Stop 03.07.15
Brakes overload MI shows white (clover leaf) 03.07.16

NOSE AND VISOR

Visor/Nose unlock light on 03.08.01
Nose 5° L Light on 03.08.03
Visor/nose standby lowering (visor up to nose 5°) 03.08.04
Nose standby lowering (5° to down) 03.08.06
Visor/nose free fall 03.08.07
Visor fails to rise 03.08.08

LIST OF CONTENTS

ABNORMAL PROCEDURES

AIR CONDITIONG

Shut down of air conditioning groups 03.10.01
Both fwd extract flow lights on 03.10.03
RH or LH fwd extract flow light on 03.10.06
Rear extract flow light on 03.10.07
Cabin excess pressure 03.10.09
Nac/wing o/heat light on 03.10.10
Duct light on 03.10.11
Abnormal rate of climb after take-off 03.10.13
Bleed overpressure and/or overpress light on 03.10.14
Prim exch light on 03.10.15
Sec exch light on 03.10.16
Loss of automatic temperature control 03.10.17
Bleed valve malfunction 03.10.18
Leak light on 03.10.19
Comparator light on 03.10.20
Fuel/air exchanger overheat 03.10.21
Loss of mass flow 03.10.22

OXYGEN

Use of passenger oxygen 03.11.01

ICE AND RAIN PROTECTION

Anti-icing left and right int and cyclic lights on 03.12.01
Anti-icing int light on 03.12.03
Anti-icing cyclic light on 03.12.05
Mast light on 03.12.07
W/shield de-ice o/heat light on 03.12.08
Visor de-ice o/heat light on 03.12.09
DV demist o/heat light on 03.12.10
ADS/Engine probe heater light on 03.12.11
Windshield emergency de-icing 03.12.12

FIRE PROTECTION

Flame sensor light on 03.13.01
Fire sensor light on 03.13.03
Wheel brake fire - not expanded 03.13.04

MISCELLANEOUS

Amber radiation light on 03.14.01
Red radiation light on 03.14.01
MWS Health monitor 03.14.03
Doors warning with aircraft pressurized 03.14.04

(Unchanged)

PRECAUTIONARY ENGINE SHUT DOWN

Engine shut down in flight required

AUTO THROTTLE MASTER .... OFF E

- Verify AUTO THROTTLE MASTER switch of affected engine off.

The AUTO THROTTLE MASTER switch is set to OFF isolating the associated engine from the auto throttle system thereby preventing total auto throttle system disconnect when the throttle lever of the engine to be shut down is retarded.

THROTTLE .... IDLE C

HP VALVE ....SHUT E

As the engine is shut down it will cause the following warnings:
HYDRAULIC LOW PRESS light (amber) on accompanied by a master warning system HYD LIGHT (amber) on and an audio (gong), when the aircraft speed is subsonic.
GEN light (amber) on accompanied by a master warning system ELEC light (amber) on and an audio (gong), when the aircraft speed is less than M = 1.10.
The N1 SIG light (amber) on accompanied by a master warning system INT light (amber) on and audio (gong) may come on when aircraft speed is subsonic.

ADJACENT ENGINE THROTTLE MASTER ....MAIN E

Verify the adjacent engine THROTTLE MASTER selector is at MAIN since the T1 probe of an engine supplies temperature information to the MAIN throttle control system of its own engine and the ALTERN throttle control system of the adjacent engine. Therefore to ensure following an engine shut down, that the adjacent engine throttle control system is receiving correct temperature information, the MAIN system should be selected.

GENERATOR ....OFF E

Set the associated generator selector to OFF to prevent slight power interrupts. Normally when an engine is shut down under subsonic or ground conditions the respective generator will trip on underspeed and no power interrupt occurs on the aircraft supply. Following engine shut down at supersonic speeds the engine windmill speeds are sufficient to maintain the generator on line. As the aircraft speed is reduced a condition occurs at approximately M = 1.10 when the input speed to the CSD is below that which will maintain correct load sharing under parallel operating conditions but above the underspeed trip

POWER PLANT

threshold. In this condition the respective BTB is tripped by the real load deficit protection and its load is now supplied by the windmilling engine generator, without assistance from the parallel system. The generator is tripped in this condition due to underspeed but since the system has been un-paralleled a busbar power interrupt occurs before the dead busbar is connected to the parallel system.

REHEAT .... OFF E

Verify the reheat selectors OFF.

SPEED ....SUBSONIC C

Reduce aircraft speed to subsonic using normal engine throttling technique during descent at 325 kt.

SYSTEM FAILURE PROCEDURES ....APPLY E

Apply Procedures to deal with system failures.

When an engine is shut down due to vibration a subsonic speed should be chosen that will meet the overriding objective of the aircraft reaching its destination or diversion airfield, provide as low a front vibration level on the engine as possible and provide as low a windmilling speed as possible.

END//

THROT LIGHT ON

CAUTION
WITH REVERSE THRUST SELECTED DO NOT CANCEL REVERSE UNTIL THE THROT LIGHT IS OFF OR THE ENGINE HAS BEEN SHUT DOWN.

With reverse thrust selected, do not attempt to cancel reverse until the THROT light (red) has been extinguished or the engine has been shut down. This is to prevent secondary nozzle bucket movement with uncontrollable high engine power.

THROTTLE MASTER ....OTHER LANE E

Setting the THROTTLE MASTER selector to the opposite selection MAIN or ALTERN will extinguish the THROT light if the selected system is serviceable.

IF THROT LT REMAINS ON
APPLY PROCEDURE:PRECAUTIONARY ENGINE SHUT DOWN

If the THROT light is not extinguished by moving the THROTTLE MASTER selector to the opposite selection during use of reverse thrust, set HP VALVE switch to SHUT and during use of forward thrust APPLY PROCEDURE PRECAUTIONARY ENGINE SHUTDOWN.

With both electrical throttle control systems failed, the engine is shut down to prevent engine surge due to uncontrolled primary nozzle movements.

ENGINE FLAME OUT

An engine flame out is indicated by a large fall in EGT followed by a reduction of N2 and N1.

The auto ignition system should relight the engine without any crew action. Should the N2 fall below 75% the engine must be regarded as flamed out.

IF HP VALVE MI READS SHUT

APPLY PROCEDURE:PRECAUTIONARY ENGINE SHUTDOWN

The HP VALVE MI reading SHUT with the HP VALVE switch at OPEN may indicate that the LP shaft failure device has operated. Once the engine has shut itself down by this means it cannot be restarted.

IF HP VALVE MI READS OPEN

THROTTLE MASTER ....OTHER LANE .... E

Select throttle master to the other lane.

Electrical power interruptions may cause malfunction of a Throttle Control Unit without causing an automatic lane change or illumination of the THROT light. This malfunction can result in an engine run down or possible flame-out.

APPLY PROCEDURE: ENGINE IN-FLIGHT START

(Unchanged)

AUTO IGNITION RELIGHT

When a flame out is detected by the engine control system with auto ignition selected on, an immediate relight attempt will take place. Operation of the auto ignition system is indicated by the LH IGN, RH IGN and START PUMP lights being on.
During relight attempt monitor the EGT and N2 until power is restored to throttle lever position then check START PUMP light is off

IF START PUMP LT ON
START PUMP C/B .... TRIP E

CIRCUIT BREAKER	PANEL	GRID REF.
ENG 1 START PUMP SUP	1-213	J6
ENG 2 START PUMP SUP	1-213	K6
ENG 3 START PUMP SUP	1-213	L6
ENG 4 START PUMP SUP	1-213	M6

CAUTION
WITH AN INOPERATIVE START PUMP, AUTO AND MANUAL RELIGHT WILL NOT BE POSSIBLE.

It is permitted to leave the start pump running but an inspection of the HP and LP turbines must be made on landing.

DURING RELIGHT

IF N2 FALLS BELOW 75% OR EGT RISES WITH A STEADY OR FALLING N2

HP VALVE .... SHUT E
AUTO IGNITION sw .... OFF E

Set the associated AUTO IGNITION switch to OFF to prevent interaction between auto relight system and manual relight attempts.

APPLY PROCEDURE : ENGINE IN FLIGHT START

ENGINE IN FLIGHT START

THROTTLE .... IDLE C

The throttle is retarded since the manual relight system is inhibited with it away from idle.

HP VALVE .... SHUT E

Set the HP VALVE to SHUT to prevent flooding the engine with fuel.

AUTO IGNITION .... OFF E

Set the AUTO IGNITION switch to OFF to prevent interaction between auto ignition system and attempt at manual relighting.

ENGINE FEED PUMPS .... ON E

Verify ENGINE FEED PUMPS of engines to be started are switched ON and scan FUEL MANAGEMENT PANEL to ensure correct engine fuel feed.

START RELIGHT sel .... RELIGHT E

Set the START RELIGHT selectors to RELIGHT in preparation for relight of engines.

30 SEC AFTER CLOSURE OF HP VALVE

30 secs is the minimum time to allow for drainage of fuel from engine.

HP VALVE .... OPEN E

Set the HP VALVE switch to OPEN to initiate the relight, this being indicated by a rising EGT. The rise in EGT should take place within 20 secs of opening the HP VALVE.

IF THE ENGINE FAILS TO RELIGHT IN 20 SEC

HP VALVE .... SHUT E

Set HP VALVE switch to SHUT to stop the engine from flooding with fuel.

Allow engine to drain and continue with relight attempts.

30 secs is the minimum drainage time required after HP VALVE closure for the first relight attempt.
If circumstances permit and further relight attempts are required allow a drainage time of 1 minute between each attempt.

contd.

POWER PLANT

ATTEMPT FURTHER RELIGHT AT LOWER
ALTITUDE OR HIGHER SPEED
(SEE RELIGHT ENVELOPE)

WHEN THE ENGINE IS STABILISED
START RELIGHT sel .... OFF E

When the N2 stabilises at the prevailing idle, set the START RELIGHT selector to OFF.

START PUMP LT .... OFF E

Setting the START RELIGHT selector to OFF switches off the start pump and ignition, this being indicated by the START PUMP light and IGN light being OFF.
If the START PUMP light is on trip associated circuit breaker.

CIRCUIT BREAKER	PANEL	GRID REF
ENG 1 START PUMP SUP	1-213	J6
ENG 2 START PUMP SUP	1-213	K6
ENG 3 START PUMP SUP	1-213	L6
ENG 4 START PUMP SUP	1-213	M6

CAUTION
WITH AN INOPERATIVE START PUMP, AUTO AND NORMAL RELIGHTS WILL NOT BE POSSIBLE.

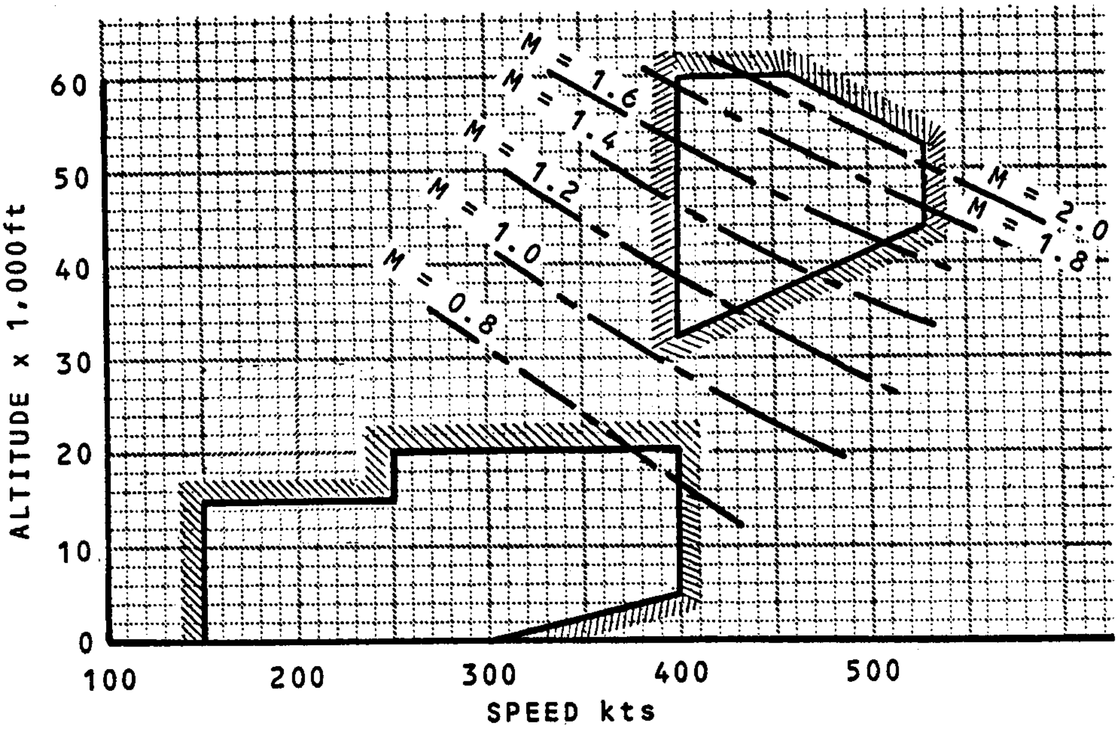
It is permitted to leave the start pump running but an inspection of the HP and LP turbines must be made on landing.

SYSTEMS .... RE-ESTABLISH E

Re-establish the status of systems affected by relight.

END//

POWER PLANT



RELIGHT ENVELOPE

NOTE: Relights may be attempted outside the envelope but may not be successful

The best area for relight attempts outside the envelope is within 375-400 kt at altitudes below 45000 ft.

ENGINE HIGH OIL TEMP LIGHT ON

Observe the fuel temperature on the FUEL TEMP instrument of the secondary instrument panel.
It is a characteristic of engine oil and fuel system design that excessive temperature within one system can interact on the other.

● ▶ WITH FUEL TEMPERATURE LESS THAN 70°C

ENGINE RECIRCULATION VALVE .... OPEN E

Set the ENGINE RECIRCULATION VALVE switch to OPEN to increase the fuel flow across the oil cooler.

If the high fuel temperature was caused by a malfunction other than a fuel heater failure, the opening of the recirculation valve is the only direct means of attempting to keep the temperature within limits, however if this is done at High Mach numbers, the characteristics of the aircraft fuel system are such that the benefits of opening the valve are only effective for a limited period of time. To minimise the possibility of arriving at an engine shut down situation therefore, it is preferable to initiate the deceleration/descent at the same time as the valve is opened.

During the deceleration/descent the associated engine RECIRCULATION VALVE will normally be selected OPEN. If other system failures require the valves to be selected shut, the SHUT selection is to have priority.

SPEED .... SUBSONIC C

Reduce speed using normal descent technique.

OIL TEMP .... MONITOR E

Monitor oil temperature.

▶ IF OIL TEMPERATURE STABILIZING AT LESS THAN 190°C

SPEED .... SUBSONIC C

Continue operation at subsonic speed

END//

contd.

IF OIL TEMPERATURE GREATER THAN 195°C OR REMAINS ABOVE 190°C FOR 5 MINS

APPLY PROCEDURE: PRECAUTIONARY ENGINE SHUTDOWN

WITH FUEL TEMPERATURE GREATER THAN 70°C

FUEL HEATER .... OFF E

Set associated engine FUEL HEATERS switch OFF

Inadvertent operation of the FUEL HEATERS will cause an increase in oil and fuel temperature, possibly to the extent of causing excessive temperature warnings. The response rate of oil temperature to corrective action is relatively slow. With the high oil temperature warning set at 180°C and the maximum continuous limit 190°C a short period of time can elapse after switching off the fuel heater to observe tendency in oil temperature before maximum limit is reached.

OIL TEMP .... MONITOR E

Monitor oil temperature.

IF OIL TEMPERATURE STABILIZING AT LESS THAN 190°C

CONTINUE WITH NORMAL FLIGHT

END//

IF OIL TEMPERATURE RISING TOWARDS LIMITING VALUES

ENGINE RECIRCULATION VALVE .... OPEN E

Set the associated ENGINE RECIRCULATION VALVE switch to OPEN to increase the fuel flow across the oil cooler.

If the high fuel temperature was caused by a malfunction other than a fuel heater failure, the opening of the recirculation valve is the only direct means of attempting to keep the temperature within limits, however if this is done at High Mach numbers, the characteristics of the aircraft fuel system are such that the benefits of opening the valve are only effective for a limited period of time. To minimise the possibility of arriving at an engine shut down situation therefore, it is preferable to initiate the deceleration/descent at the same time as the valve is opened.

(Deletion)

During the deceleration/descent the associated engine RECIRCULATION VALVE will normally be selected OPEN. If other system failures require the valves to be selected shut, the shut selection is to be priority.

SPEED ....SUBSONIC C

Reduce speed using normal descent technique

OIL TEMP ....MONITOR E

Monitor oil temperature

IF OIL TEMPERATURE STABILIZING AT LESS THAN 190°C

SPEED .... SUBSONIC C

Continue operation at subsonic speed

END//

IF OIL TEMPERATURE GREATER THAN 195°C OR
REMAINS ABOVE 190°C FOR 5 MINS

APPLY PROCEDURE: PRECAUTIONARY ENGINE SHUTDOWN

(Deletion)

REHEAT LIGHT ON

(Reheat not in use)

Observe the FUEL flow instrument flag.

WITH FUEL FLOW FLAG SHOWING FE

The FUEL flow flag showing FE indicates the fuel flow to the reheat system (reheat not in use) is at an acceptable level.

CONTINUE WITH NORMAL FLIGHT

END//

WITH FUEL FLOW FLAG SHOWING FT

The FUEL flow flag showing FT indicates the fuel flow to the the reheat system (reheat not in use) is above an acceptable level.

AUTO THROTTLE MASTER .... OFF E

The AUTO THROTTLE MASTER switch is set to off isolating the associated engine from the auto throttle system thereby preventing total auto throttle system disconnect when the throttle lever of the engine to be shut down is retarded.

THROTTLE .... IDLE C

HP VALVE .... SHUT E

As the engine is shut down it will cause the following warnings:
HYDRAULIC LOW PRESS light (amber) on accompanied by an MWS HYD (amber), when the aircraft speed is subsonic.
GEN light (amber) on accompanied by an MWS ELEC (amber), when the aircraft speed is less than M = 1.10.
The N1 SIG light (amber) on accompanied by an MWS INT (amber) may come on when aircraft speed is subsonic.

ADJACENT ENGINE THROTTLE MASTER .... MAIN E

Verify the adjacent engine THROTTLE MASTER selector is at MAIN since the T1 probe of an engine, supplies temperature information to the MAIN throttle control system of its own engine and the ALTERN throttle control system of the adjacent engine. Therefore to ensure following an engine shut down, that the adjacent engine throttle control system is receiving correct temperature information, the MAIN system should be selected.

GENERATOR .... OFF E

Set the associated generator selector to OFF to prevent slight power interrupts. Normally when an engine is shut down under subsonic or ground conditions the respective generator will trip on underspeed and no power interrupt occurs on the aircraft supply. Following engine shut down at supersonic speeds the engine windmill speeds are sufficient to maintain the generator on line. As the aircraft speed is reduced a condition occurs at approximately M = 1.05 when the input speed to the CSD is below that which will maintain correct load sharing under parallel operating conditions but above the underspeed trip threshold. In this condition the respective BTB is tripped by the real load deficit protection and its load is now supplied by the windmilling engine generator, without assistance from the parallel system. The generator is tripped in this condition due to underspeed but since the system has been un-paralleled a busbar power interrupt occurs before the dead busbar is connected to the parallel system.

LP VALVE ....SHUT E

Set LP VALVE selector for engine shut down to SHUT to stop fuel flow to reheat system.

The engine FUEL FLOW instrument flag showing FT indicates fuel is still being supplied to the reheat system because reheat fuel supply is not affected by HP VALVE closure.

CSD .... DISC E

Unguard and set CSD switch to DISC to prevent over-heating of the CSD oil due to loss of cooling fuel flow across CSD oil cooler.

Reset of the CSD is only possible on the ground with the engine stopped.

COND VALVE ....OFF E

Set associated COND VALVE selector to OFF.

Do not use the air conditioning group of the engine with LP VALVE shut since closure of the LP VALVE prevents cooling fuel flow across heat exchanger of associated air conditioning group.

SPEED .... SUBSONIC C

Reduce speed using normal descent technique.

SYSTEM FAILURE PROCEDURES .... APPLY E

POWER PLANT

Apply Procedures to deal with system failures.

The REHEAT light on (reheat not in use) procedure is intended to cover the case where a fault has developed allowing a fuel flow above an acceptable level in the reheat system.

END//

REHEAT FAILS TO CANCEL

This procedure is intended to cover the failure of reheat to cancel immediately after use and should not be confused with REHEAT LIGHT ON procedure.

IF FUEL FLOW DOES NOT REDUCE

A reduction of FUEL flow and AREA is an indication of reheat cancellation.

REHEAT SYSTEM AC C/Bs .... TRIP E

AC CIRCUIT BREAKERS

CIRCUIT BREAKER	PANEL	GRID REF
ENG 1 REHEAT AMP SUP	14-215	C12
ENG 2 REHEAT AMP SUP	13-215	B14
ENG 3 REHEAT AMP SUP	13-216	B 7
ENG 4 REHEAT AMP SUP	14-216	D 7

Two reheats are the minimum required for transonic acceleration: however due note must be taken of additional fuel usage with one or two reheats failed.

END//

(Unchanged)

EGT INSTRUMENT LIGHT ON

THROTTLE MASTER ....OTHER LANE E

Set the THROTTLE MASTER selector to the other selection, MAIN or ALTERN observing the EGT light goes OFF, to enable the selected engine control rating to be temperature limited because EGT information is supplied directly to the selected throttle control system.

IF THE EGT INSTRUMENT LT REMAINS ON

EGT and N2 ....MAINTAIN WITHIN LIMITS E

Continued engine operation is permitted but the N2 and EGT must be monitored and if necessary the engine manually controlled to observe the limitations. The engine handling ability may be impaired and careful handling is recommended.

With the EGT instrument light on the manual N2 limiter datums of the affected engine control system are automatically depressed 0.5%. This should prevent infringement of the EGT lmitations.

CAUTION

IF THE EGT INSTRUMENT LIGHT IS ON AND THE EGT INDICATION HAS FAILED AND N2 FALLS BELOW 70% RETARD THROTTLE LEVER TO IDLE AND LEAVE AT IDLE.

DO NOT USE REVERSE THRUST ON ASSOCIATED ENGINE

ENGINE RELIGHT ATTEMPTS WITH THE EGT INSTRUMENT LIGHT ON ARE ONLY PERMITTED IF THE ASSOCIATED EGT INDICATOR IS WORKING SATISFACTORILY.

END//

INTAKE HYD LIGHT ON

AFFECTED INTAKE .... YELLOW E

Set the HYD selector for the affected intake to YELLOW to confirm the automatic changeover of hydraulic supplies and observe the HYD light is OFF.

IF INTAKE HYD LT REMAINS ON

The intake HYD light remaining on after YELLOW selection indicates operation of yellow tank second low level switch which cuts off hydraulic supplies to the spill system, except when the RAMP/SPILL MASTERS is at MAN.

Before the RAMP/SPILL master switch is selected to MAN, the ramps remain operative with a restricted range for slow throttle movements.

RAMP/SPILL MASTER .... MAN E

Setting the RAMP/SPILL MASTER switch to MAN enables the intake surfaces to be inched and removes all warnings from the intake panel except the INTAKE light.

APPLY PROCEDURE: INTAKE LIGHT ON

INTAKE LIGHT ON

AIR INTAKE LANE rty sel .... A E

Rotate affected intake LANE rotary selector to non-auto A position, observe the INTAKE light is off.

IF INTAKE LT REMAINS ON
AIR INTAKE LANE rty sel .... B E

Rotate affected intake LANE rotary selector to non-auto B position, observe the INTAKE light is off.

The initial LANE reselection must not be attempted more than once per incident.

IF INTAKE LT REMAINS ON
RAMP SPILL MASTER .... MAN E

Setting the RAMP SPILL MASTER switch to MAN enables the intake surfaces to be inched.

Setting the RAMP SPILL MASTER switch to MAN removes all warnings from the intake panel except the INTAKE light.

▶ IF NO ASSOCIATED MAIN SYSTEM LOW PRESSURE AND/OR LOW LEVEL WARNING

Check the serviceability of the main blue or green hydraulic system associated with intake with INTAKE light on.

AFFECTED INTAKE .... BLUE GREEN E

Set the HYD selector of affected intake to BLUE or GREEN to enable inching of intake surfaces.

REHEAT .... ALL OFF E

Verify the reheat selectors of all engines at OFF

▶ IF SPEED GREATER THAN M = 1.50

SPEED ....REDUCE TO M = 1.50 C

Reduce aircraft speed to M = 1.50 by retarding throttle lever (s) for unaffected intake/engine(s) using normal throttling technique, and handling throttle lever(s) for affected intake/engine(s) to maintain INTAKE PRESSURE RATIO ERROR between the amber bands.

contd.

AFFECTED INTAKE/ENGINES .... MAINTAIN POINTER BETWEEN AMBER BANDS E

Following an intake control failure if the INTAKE PRESSURE RATIO ERROR instrument pointer lies in the left amber band the throttle lever must be retarded. If the pointer lies in the right amber band the throttle lever must be advanced. Correct intake-engine matching is indicated when pointer is between amber bands.

NOTE

Between M = 1.95 and M = 1.8, pointer movement with change in Mach number may be rapid, particular care should therefore be taken in making the necessary throttle adjustments in this region.

IF SPEED IS AT OR LESS THAN M = 1.50
AFFECTED INTAKE/ENGINE .... IDLE C

Retard throttle lever of affected intake/engine to idle.

SPEED .... SUBSONIC C

AT M = 1.30
RAMP .... 0% E

Inch the ramp for the affected intake to 0%

SPILL .... 0% E

Inch spill door for affected intake to 0%

IF RAMP & SPILL DOORS AT 0%
CONTINUE WITH NORMAL DESCENT

END//

IF RAMP & SPILL DOORS NOT AT 0%
AFFECTED INTAKE/ENGINE .... IDLE C

Leave the throttle lever of affected intake/engine at idle since high power settings with ramp and spill not at 0% may induce engine surge.

CAUTION

DO NOT USE REVERSE THRUST IN FLIGHT ON AFFECTED INTAKE/ENGINE.

POWER PLANT

AT M = 0.60
RAMP POSITION FOR AFFECTED
INTAKE/ENGINE .... OBSERVE E

IF RAMP POSITION GREATER THAN 50%
CONTINUE WITH NORMAL DESCENT
BUT KEEP AFFECTED INTAKE/ENGINE AT IDLE

END//

IF RAMP POSITION LESS THAN 50%
ENGINE CONTROL SCHEDULE .... LO E

Set ENGINE CONTROL SCHEDULE selector to LO observing the
ENGINE CONTROL SCHEDULE LO lights are ON

IF LO NOT OBTAINED
CONTINUE WITH NORMAL DESCENT BUT KEEP
AFFECTED INTAKE/ENGINE AT IDLE

END//

IF LO OBTAINED

AFFECTED INTAKE/ENGINE .... MOVE THROTTLE SLOWLY C

END//

CAUTION

ON LANDING IF RAMP POSITION GREATER THAN 20% LIMIT REVERSE THRUST TO REVERSE IDLE ON AFFECTED INTAKE/ENGINE. IF RAMP POSITION WITHIN RANGE 0 - 20% NORMAL REVERSE THRUST MAY BE USED.

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AUX INLET MI FAILS TO READ OPEN

●▶ **SPEED IS GREATER THAN 200 KT**
CONTINUE NORMAL FLIGHT

CONTINUE//

●▶ **SPEED IS LESS THAN 200 KT**

N2 .... REDUCE TO LESS THAN 85% C

Set the affected engine throttle lever to 85% N2 and use only the remaining throttles for thrust changes until reverse is selected after landing

At aircraft speeds of less than 200 kt the airflow to the engine will be affected should maximum power be selected with the intake auxiliary inlet shut.

The above N2% rpm limit is applicable to forward thrust configuration only.

END //

POWER PLANT

INTAKE INCIDENCE SIGNAL FAILURE LIGHT ON

INTAKE .... IDENTIFY E

Identify affected intake(s) by reference to MWS INT lights.

As the alpha light may be on for failure of the incidence signal to any intake, the Master Warning System INT light(s) (amber) is/are the only positive indication of the affected intake(s).

LANE .... OTHER AUTO POSITION E

Rotate the LANE rotary selector of the affected intakes to the other AUTO position
Observe the α light

IF α FAILURE LIGHT REMAINS ON

MAINTAIN 1g INCIDENCE WHEN SPEED IS GREATER THAN M = 1.80 WHEREVER POSSIBLE

END//

INTAKE N1 SIG AND/OR LANE LIGHT ON

LANE ....NON AUTO POSITION TO AGREE WITH LANE IN USE LT E

Rotate the LANE rotary selector of the affected intake to the non-auto position that agrees with the lane in use light (green) that is on.

The N1 SIG light is always accompanied by a LANE light.

IF N1 SIG LT REMAINS ON

MAINTAIN FIXED THROTTLE LEVER ANGLE ON AFFECTED ENGINE WHEN SPEED IS GREATER THAN M = 1.80 WHEREVER POSSIBLE.

END//

IF LANE AND N1 SIG LTS OFF

LANE ....AUTO POSITION TO AGREE WITH LANE IN USE LT E

Rotate the LANE rotary selector of the affected intake to auto position which agrees with the lane in use light (green) so that in the event of a subsequent more serious lane failure the first lane will be automatically re-selected.

If both the minor failures Alpha and N1 signal occur on the same intake the lane with the Alpha failure should be selected since it is the least limiting of the failures.

END//

N1 REDUCE LIGHT ON

N1 Reduce light on continuously

THROTTLE MASTER .... OTHER LANE E

Set THROTTLE MASTER selector of associated engine to opposite selection, MAIN or ALTERN.

IF N1 REDUCE LT REMAINS ON

INTAKE .... OTHER AUTO POSITION E

Rotate the associated AIR INTAKE LANE rotary selector to the other AUTO position

IF N1 REDUCE LT REMAINS ON

SPEED .... DO NOT EXCEED M = 1.95 C

Do not exceed M = 1.95 with the N1 Reduce light on since the affected intake is operating supercritically and the propulsion unit is not operating at optimum efficiency.

END//

FUEL FILTER LIGHT ON

CAUTION
WITH THE FUEL FILTER LIGHT ON A LOSS OF ENGINE POWER MAY OCCUR.

ENGINE RECIRCULATION VALVE ....SHUT E

Verify associated ENGINE RECIRCULATION VALVE switch at SHUT to ensure that the possibly restricted flow across the fuel filter is available for engine use.

ENGINE FUEL TEMPERATURE ....OBSERVE E

Observe the FUEL TEMP instrument reading of affected engine on secondary instrument panel.

IF ENGINE FUEL TEMPERATURE ABOVE +70° C
CONTINUE WITH NORMAL FLIGHT

END//

IF ENGINE FUEL TEMPERATURE BELOW +70°C
FUEL HEATER ....ON E

Set the FUEL HEATER selector to ON since with a fuel temperature of less than plus 70°C in the burner manifold a fuel temperature of less than plus 5°C may exist at the fuel filter. At this temperature ice crystals may form in the fuel, causing clogging of the filter giving rise to high differential pressure.

WHEN ENGINE FUEL TEMPERATURE ABOVE +70°C
FUEL HEATER ....OFF E
ENGINE FUEL TEMPERATURE .... MONITOR E

END//

ENGINE INLET LOW PRESS LIGHT ON

ENGINE FEED PUMPS ....ON E

Verify affected ENGINE FEED PUMPS switches at ON

ENGINE RECIRCULATION VALVE ....SHUT E

Verify affected ENGINE RECIRCULATION VALVES switch at SHUT observing the engine LOW PRESS light goes off.

Shutting the ENGINE RECIRCULATION VALVE ensures that the maximum available flow from the engine feed pumps is directed to the engine.

IF ENGINE INLET LOW PRESS LT ON

No further action unless accompanied by another warning

END//

HIGH FUEL TEMP LIGHT ON

ENGINE FUEL HEATER .... OFF E

Set associated FUEL HEATERS selector to OFF, since in the event of the high temperature in the fuel system being caused by an inadvertent operation of the fuel heater, Setting the FUEL HEATERS selectors to OFF should reduce the fuel temperature immediately.

ENGINE FUEL TEMPERATURE .... OBSERVE E

Monitor FUEL TEMP instrument reading on secondary instrument panel

IF ENGINE FUEL TEMPERATURE REDUCING

CONTINUE WITH NORMAL FLIGHT

END//

IF ENGINE FUEL TEMPERATURE INCREASING

ENGINE RECIRCULATION VALVE ....OPEN E

If the high fuel temperature is caused by a malfunction other than a fuel heater failure, the opening of the recirculation valve is the only direct means of attempting to keep the temperature within limits. However, if this is done at high Mach number the characteristics of the aircraft fuel system are such that the benefits of opening the valve are only effective for a limited period of time.

To minimise the possibility of arriving at an engine shut down situation therefore it is preferrable to initiate the deceleration/descent at the same time as the valve is opened.

During deceleration/descent the ENGINE RECIRCULATION VALVES will normally be selected OPEN, if any other system failure requires the valve to be selected SHUT the shut selection is to take priority.

SPEED .... SUBSONIC C

Reduce aircraft speed to subsonic using normal engine throttling technique during descent at 325 kt.

ENGINE FUEL TEMPERATURE .... MONITOR E

Monitor FUEL TEMP instrument reading on secondary instrument panel.

IF ENGINE FUEL TEMPERATURE LESS THAN 150° C

SPEED .... REMAIN SUBSONIC C

END//

IF ENGINE FUEL TEMPERATURE GREATER THAN 150°C FOR 2 MIN OR EXCEEEDS 170°C

APPLY PROCEDURE PRECAUTIONARY ENGINE SHUT DOWN

END//

ENGINE ANTI-ICING MALFUNCTION

●▶ IGV PRESS LT ON WITH ENGINE ANTI-ICING OFF

ENGINE ANTI-ICING sw ....CYCLE ON/OFF E

Set the ENGINE ANTI-ICING switch to ON then OFF in attempt to close the anti-icing air supply valve as the light on with switch at OFF indicates air pressure in the anti-icing supply duct.

IF IGV PRESS LT REMAINS ON

UNRESTRICTED ENGINE OPERATION PERMITTED BUT WITH TOTAL TEMPERATURE GREATER THAN 80°C and N2 GREATER THAN 96% DAMAGE MAY OCCUR TO THE No. 1 BEARING VIBRATION PICKUP CABLE.

END//

●▶ IGV PRESS LT OFF WITH ENGINE ANTI-ICING ON

▶ IF THROTTLE AT IDLE

N2 ....INCREASE BY 10% E

Advance throttle lever of associated engine to increase N2 by approxiamtely 10% and check the IGV light comes on.

If the light comes on return throttle to idle as the system is functioning but at the idle setting there is insufficient pressure to put the light on.

IF IGV PRESS LT OFF WITH THROTTLE ABOVE IDLE
LEAVE ICING CONDITIONS

If the aircraft is on the ground consult MEL.

END//

NOZZLE LIGHT ON NOT ASSOCIATED WITH ADC FAILURE

(ENGINE CONTROL SCHEDULE rty sel AT NORMAL ABOVE M = 1.0)

The ENGINE CONTROL SCHEDULE lights are to be observed to establish correct schedule operation.

The correct ENGINE CONTROL SCHEDULE light indications are:

LO lights (green) on with the ENGINE CONTROL SCHEDULE rotary selector at NORMAL with the aircraft on the ground, or flying at speeds less than 220 kt or during reheat operation with the ENG RATING MODE switch at TAKE-OFF and the ENGINE CONTROL SCHEDULE selector at AUTO

LO lights (green) on with the ENGINE CONTROL SCHEDULE rotary selector at FLYOVER (F/O) with the aircraft on the ground or flying at speeds less than 220 kt or during reheat operation with the ENG RATING MODE switch at TAKE-OFF and the ENGINE CONTROL SCHEDULE selector at AUTO

MID lights (white) on with the ENGINE CONTROL SCHEDULE rotary selector at NORMAL with the aircraft speed greater than 220 kt, the ENG FLIGHT RATING switch at CLIMB or CRUISE the ENG RATING MODE switch at FLIGHT, reheat operating and the ENGINE CONTROL SCHEDULE selector at AUTO

MID lights (white) on with the ENGINE CONTROL SCHEDULE rotary selector at APPROACH (MID) and the ENGINE CONTROL SCHEDULE selector at AUTO

HI lights (white) on with the ENGINE CONTROL SCHEDULE rotary selector at NORMAL with the aircraft speed greater than 220 kt, reheat cancelled and the ENGINE CONTROL SCHEDULE selector at AUTO

HI lights (white) on with the ENGINE CONTROL SCHEDULE rotary selector at FLYOVER (F/O) with the aircraft speed greater than M = 1.0, reheat cancelled and the ENGINE CONTROL SCHEDULE selector at AUTO

F/O lights (white) on with the ENGINE CONTROL SCHEDULE rotary selector at FLYOVER (F/O) with the aircraft speed greater than 220 kt but less than M = 1.0, reheat cancelled and the ENGINE CONTROL SCHEDULE selector at AUTO

POWER PLANT

● ▶ **WITH ALL ENGINE CONTROL SCHEDULE LTS INDICATING CORRECT SCHEDULE OPERATION**

N2,N1 AND EGT .... MONITOR DURING SUPERSONIC CRUISE E

During the use of cruise rating with the static temperature colder than -51 °C with the throttle levers fully advanced monitor the N2, N1 and EGT. Should it appear likely that the cruise rating limitations will be exceeded set the THROTTLE MASTER selector of the associated engine to the opposite selection, MAIN or ALTERN.

IF A SYMMETRIC PAIR OF ENGINES EXCEED OPERATING CRUISE RATINGS AT STATIC TEMPERATURES COLDER THAN -51°C

THROTTLE MASTERS .... OTHER LANE E

Set THROTTLE MASTER selector for affected engines to opposite selection, MAIN or ALTERN

A function failure of NASU automatically transfers control of the secondary nozzle buckets and high engine control schedule together with ASOV closure signal to the other NASU. The FLYOVER and approach schedules and the static temperature signal are still available from the NASU with the function failure.

A power supply failure to a NASU causes nozzle buckets, high schedule and ASOV signal to transfer but the flyover and approach schedules together with static temperature signal outputs are lost. Setting the throttle master selectors for affected engines to the opposite selection enables the flyover and approach schedules together with the static temperature outputs from the non-failed NASU to be utilized

END//

● ▶ **WITH A SYMMETRIC PAIR OF ENGINE CONTROL SCHEDULE LIGHTS INDICATING INCORRECT SCHEDULE OPERATION**

THROTTLE MASTERS .... OTHER LANE E

Set THROTTLE MASTER selector for affected engines to opposite selection, MAIN or ALTERN

END//

(Unchanged)

● ▶ **WITH ALL ENGINE CONTROL SCHEDULE LIGHTS INDICATING INCORRECT SCHEDULE OPERATION**

ENGINE CONTROL SCHEDULE ....ABOVE 220 KT HI
BELOW 220 KT LO E

The aircraft speed should be observed and if greater than 220 kt, set the ENGINE CONTROL SCHEDULE selector to HI. If aircraft speed less than 220 kt set the ENGINE CONTROL SCHEDULE selector to LO.

POWER PLANT

N2, N1 and EGT .... MONITOR DURING SUPERSONIC CRUISE E

A power supply failure to both NASUs loses all output from the NASUs, this causes the secondary nozzle bucket to drive to the fully open position and all engines to operate in the LO engine control schedule.

The loss of the static temperature signal to the ECU loses the static temperature correction of cruise rating limitations. Therefore, during the use of cruise rating or static temperatures colder than -51 C with throttle levers fully advanced, monitor N1, N2 and EGT. If it appears likely that they will exceed their cruise rating limitations retard the throttle levers of the associated engine(s).

IF ENGINES EXCEED OPERATING CRUISE RATINGS WHEN CRUISING AT STATIC TEMPERATURES COLDER THAN -51 C

THROTTLES ....RETARD TO OBSERVE CRUISE RATINGS E

END//

ENGINE VIBRATION
AMBER WARNING LIGHT ON

For affected engines observe vibration levels with FRONT then REAR selected.

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● FRONT VIBRATION WARNINGS

Observe the engine instruments and general aircraft vibration in an attempt to establish validity of the warning.

IF ENGINE MALFUNCTION OR GENERAL AIRCRAFT VIBRATION OBSERVED

APPLY PROCEDURE: PRECAUTIONARY ENGINE SHUTDOWN

IF NO EVIDENCE OF ENGINE MALFUNCTION

N2 .... REDUCE BY 10% E

Retard the associated engine throttle lever to reduce N2 by at least 10%.
Observe the FRONT vibration level to see if retarding the throttle lever has reduced the vibration level.

IF INDICATED VIBRATION LEVEL DOES NOT REDUCE WITH N2

RETURN TO NORMAL ENGINE HANDLING .... E

If the indicated vibration level does not reduce as the N2 is reduced, or the vibration level is fluctuating erratically, and there is no other evidence of vibration, the warning may be considered false.

END//

(Completely Revised)

IF INDICATED VIBRATION LEVEL REDUCES WITH N2

N2 .... ADJUST UNTIL VIBRATION BELOW 5 E

Adjust throttle lever of the affected engine until indicated vibration level, with FRONT selected is less than 5 ins/sec, then cancel the warning.
The engine may be operated manually so as not to exceed a vibration level of 5 ins/sec.

IF INDICATED VIBRATION GREATER THAN 5 INS/SEC WITH THROTTLE AT IDLE

APPLY PROCEDURE: PRECAUTIONARY ENGINE SHUTDOWN

NOTE
All vibration warnings greater than 10 INS/SEC should be logged.

REAR VIBRATION LEVEL GREATER THAN 4 INS/SEC

NOTE
Do not action rear vibration warnings during take-off, but the warnings should be logged.

REHEAT .... OFF E

Verify affected engine RHT selector at OFF.

Two reheats are the minimum requirement for transonic acceleration, however, due note must be taken of additional fuel usage with one or two reheats failed.

With reheat on, a shock wave pattern within the jet pipe will be the cause of the vibration.

REAR vibration levels greater than 4 INS/SEC when reheat is not in use should be reported.

VIBRATION WARNING .... RESET E

END//

(Completely Revised)

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CONTINUOUS ENGINE SURGE ABOVE M = 1.3

CAUTION
IF AT ANY TIME DURING SURGE AN UNUSUALLY RAPID RISE IN EGT OCCURS IMMEDIATELY SHUT DOWN THE ENGINE.

ATTITUDE MAINTAIN

If the auto-pilot or flight director is in use, engage PITCH HOLD mode immediately before throttling to prevent large pitch changes occuring when the throttles are retarded

THROTTLES .... IDLE C

The throttle levers should be retarded to idle consistent with passenger comfort and the need to reduce power very quickly.

During the throttling of the engine to idle at speeds greater than M = 1.60 the action of throttling may induce a mild 'pop' surge, this slight surge may be disregarded providing they are not accompanied by unusual engine instrument readings or engine failure indications.

THROTTLE MASTERS .... ALL OTHER LANE E

Set all THROTTLE MASTER selectors to the opposite selection MAIN or ALTERN.

FWD FUEL TRANS sw .... O/RIDE C

Unguard and set the FUEL FWD TRANS switch to O/RIDE.

The forward transfer of fuel is a precautionary measure linked to the reduction in engine power and thereby speed. Careful monitoring of the transfer operation is required and it should be terminated at any time the circumstances demand.

AIR INTAKES .... ALL OTHER LANE E

Rotate all AIR INTAKE LANE rotary selectors to the other AUTO position.

INTAKE HYDRAULICS .... ALL YELLOW E

Set all intake HYD selectors to YELLOW.

Selecting the opposite AUTO selections on the Intake lanes and Hydraulics, together with the throttles, is an attempt to stop the surge, which, may have been induced by an undetected fault in one of the selections.

REHEAT .... ALL OFF E

Verify all the reheat selectors at OFF.

The retarding of the throttles will have cancelled reheat, putting the selectors to OFF ensures that reheat will not be inadvertently re-activated when the throttle lever is advanced.
Putting the selectors of the non-surging engines to OFF ensures reheat fuel is not used until surge situation is resolved.

IF SURGING CONTINUES

ENGINE CONTROL SCHEDULE .... LO E

Set the associated ENGINE CONTROL SCHEDULE selector to LO to reduce the engines demand for air.

ENGINES .... IDENTIFY E

Identify the surging engine(s) by reference to the PRESSURE RATIO ERROR instrument and the EGT instrument.

At high supersonic speeds, an engine surge will induce a surge of the other engine in the same nacelle, therefore positive identification is difficult, the fluctuating ENGINE PRESSURE RATIO and/or rising EGT will assist in identification, but should there be doubt apply corrective action to both engines.

RAMP .... INCH TO 70% E

Set the RAMP/SPILL MASTER switch(es) to MAN and inch the ramp(s) to 70%.

SPILL .... INCH TO 50% E

Inch the spill door(s) to 50%

A ramp position of 70% and a spill door position of 50% is the best intake configuration at high supersonic speeds with the throttle at idle.

(Unchanged)

IF SURGING CONTINUES

HP VALVE ....SHUT E

As the engine is shut down it will cause the following warnings:
HYDRAULIC LOW PRESS light (amber) on accompanied by a MWS HYD when the aircraft speed is subsonic.
GEN light (amber) on accompanied by a MWS ELEC (amber), when the aircraft speed is less than M = 1.10.
The N1 SIG light (amber) on accompanied by a MWS INT (amber).
may come on when aircraft speed is subsonic.

POWER PLANT

ADJACENT ENGINE THROTTLE MASTER .... MAIN E

Verify the adjacent engine THROTTLE MASTER selector is at MAIN since the T1 probe of an engine supplies temperature information to the MAIN throttle control system of its own engine and the ALTERN throttle control system of the adjacent engine. Therefore to ensure following an engine shut down, that the adjacent engine throttle control system is receiving correct temperature information, the MAIN system should be selected.

AUTO THROTTLE MASTER .... OFF E

Verify AUTO THROTTLE MASTER switch of affected engine off.

The AUTO THROTTLE MASTER switch is set to OFF isolating the associated engine from the auto throttle system.

RAMP ....INCH TO 100% E

Inch the ramp to 100%

SPILL .... INCH TO 100% E

Inch the spill door to 100%

The ramp at 100% and the spill door at 100% is the best intake configuration at supersonic speeds for the shut down engine.

END//

IF SURGE STOPS AFTER INITIAL ACTIONS

ADVANCE THROTTLES SINGLY. IF NO SURGE OCCURS RETURN TO FLIGHT PLAN.

SHOULD SURGE OCCCUR DURING THROTTLE ADVANCE, RETURN THROTTLE TO IDLE, REDUCE SPEED TO SUBSONIC. WHEN SPEED LESS THAN M = 1.30 ADVANCE THROTTLE. IF SURGE OCCURS VERIFY RAMP AT 0%, SPILL AT 0%. USE HIGHEST SURGE FREE POWER AVAILABLE.
END//

IF SURGE STOPS AFTER 70% RAMP AND 50% SPILL OBTAINED

REDUCE SPEED TO SUBSONIC. WHEN SPEED LESS THAN M = 1.30 INCH RAMP TO 0% AND SPILL TO 0%. RETURN ENGINE CONTROL SCHEDULE SELECTOR BACK TO AUTO. CONTINUE FLIGHT AT SUBSONIC SPEED USING THROTTLE AS REQUIRED.

END//

IF ENGINE SHUT DOWN

REDUCE SPEED TO SUBSONIC. WHEN SPEED M = 1.30 INCH RAMP TO 0% AND SPILL TO 0% RETURN ENGINE CONTROL SCHEDULE SELECTOR TO AUTO. RELIGHT ENGINE.

IF SURGE OCCURS WHEN ADVANCING THROTTLE AFTER ENGINE RELIGHT USE HIGHEST SURGE FREE POWER AVAILABLE.

END//

CONTINUOUS ENGINE SURGE AT OR BELOW M = 1.3

CAUTION
IF AT ANY TIME DURING SURGE AN UNUSUALLY RAPID RISE IN EGT OCCURS IMMEDIATELY SHUT DOWN THE ENGINE.

ENGINE .... IDENTIFY E

A rising EGT may assist in the identification of the surging engine

THROTTLE .... IDLE C

If safety considerations permit retard the throttle of surging engine to idle

THROTTLE MASTER .... OTHER LANE E

Set THROTTLE MASTER selector of surging engine to the opposite selection, MAIN or ALTERN.

AIR INTAKE .... OTHER LANE E

Set AIR INTAKE LANE rotary selector of surging engine/intake to other AUTO position.

INTAKE HYDRAULIC .... YELLOW E

Set the intake HYD selector of surging engine/intake to YELLOW

Selecting the other selections on the INTAKE lanes and Hydraulics, together with the throttles,is an attempt to stop the surge, which,may have been induced by an undetected fault in one of the selections.

REHEAT .... ALL OFF E

Verify all the reheat selectors at OFF.

The retarding of the throttle lever on the surging engine will have cancelled reheat, putting its selector to OFF ensures reheat will not be inadvertently re-activated when throttle lever is advanced.
Putting the selectors of the non-surging engines to OFF ensures reheat fuel is not used until surge situation is resolved.

IF SURGE CONTINUES

RAMP ....INCH TO 0% E

Inch the ramp of surging engine to 0%

SPILL .... INCH TO 0% E

Inch the spill door of surging engine to 0%

The ramp and spill position of 0% is the intake configuration for high power setting at speeds below M = 1.30.

IF SURGE CONTINUES

RAMP/SPILL MASTER .... AUTO E

The engine still surging when ramp and spill are set to 0% indicates the surging is not being maintained by intake geometry, therefore setting the RAMP/SPILL MASTER switch to AUTO enables the intake surfaces to be automatically positioned when engine is shut down.

APPLY PROCEDURE ; PRECAUTIONARY ENGINE SHUTDOWN

END//

IF SURGE OCCURS DURING THROTTLE ADVANCE AFTER CORRECTIVE ACTIONS, VERIFY RAMP AT 0%, SPILL AT 0%, USE HIGHEST SURGE FREE POWER AVAILABLE.

END//

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ENGINE MALFUNCTION NOT ASSOCIATED WITH THROT LIGHT ON

This procedure is for use in the event of such failures as inadvertent increase or decrease of thrust, unstable running, primary nozzle malfunction, inadvertent operation of wind down system or auto ignition system.

THROTTLE MASTER .... OTHER LANE E

Set associated THROTTLE MASTER selector to the opposite selection, MAIN or ALTERN.

NOTE
If malfunction consisted of incorrect primary nozzle operation, and normal operation of nozzle was restored by lane change, monitor engine in case malfunction recurs.

If condition persists subsequent actions are dependent on the failure mode and are as follows:

● ▶ Inadvertent change of thrust or unstable running

THROTTLE .... IDLE C

Retard associated throttle lever to idle

▶ IF engine stabilises at idle

Continued operation at idle is permitted, provided all other indications are normal.

END//

▼ IF condition persists (inadvertent change of thrust or unstable running with throttle at idle)

Apply procedure: PRECAUTIONARY ENGINE SHUT DOWN

CAUTION
IN THE EVENT OF INADVERTENT INCREASE IN THRUST WITH REVERSE THRUST SELECTED, REVERSE THRUST SHOULD NOT BE CANCELLED UNTIL ENGINE SPEED HAS BEEN REDUCED TO IDLE OR THE ENGINE HAS BEEN SHUT DOWN.

contd.

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Primary nozzle Malfunction

IF AREA indicates nozzle jammed at greater than 15% or has inadvertently moved to 84% or greater:

NOTE

Inadvertent movement to 84% or greater is defined as an inadvertent increase in primary nozzle area not associated with a selected change in engine operating condition.

In subcruise with AT and F/O it is particularly important to ensure that engines are reasonably synchronised when comparing A_J, as a significant difference in A_J can result from a 1% difference in N_2.

Apply procedure: PRECAUTIONARY ENGINE SHUT DOWN

IF AREA indicates nozzle jammed at 15% or less

SPEED.. SUBSONIC C

Reduce speed to subsonic using the normal deceleration/ descent technique.

Normal engine operation is permitted except that the use of reheat or reverse thrust is prohibited on the affected engine.
At maximum power setting the N2 may be depressed by up to 5%.

END//

If IGN lights and start pump light on

AUTO IGNITION .... OFF E

Set associated AUTO IGNITION switch to OFF

END//

contd

(Completely Revised)

● ▶ WIND DOWN light on, not accompanied by bucket movement

THROTTLE .... IDLE C

Retard associated throttle lever to idle

WIND DOWN C/Bs .... TRIP E

Trip the associated wind down circuit breakers

CIRCUIT BREAKER	PANEL	GRID REF
ENG 1 WIND DOWN CONT SUP 1 ENG 1 WIND DOWN CONT SUP 2	5-213 1-213	B1 C7
ENG 2 WIND DOWN CONT SUP 1 ENG 2 WIND DOWN CONT SUP 2	1-213 5-213	F4 C1
ENG 3 WIND DOWN CONT SUP 1 ENG 3 WIND DOWN CONT SUP 2	1-213 5-213	F5 C2
ENG 4 WIND DOWN CONT SUP 1 ENG 4 WIND DOWN CONT SUP 2	5-213 1-213	B2 C8

THROTTLE .... AS REQUIRED C

The wind down system is normally inoperative with the throttle lever at idle.

END//

(Unchanged)

CON LIGHT ON

●▶ CON light (amber) on during take-off at speed less than 60 kt

REHEAT .... RESELECT E

Set the associated reheat selector to OFF then RHT
Only one reselection is permitted.

A CON light (amber) is on to indicate a failure to detect reheat light up.

END//

●▶ CON light (amber) on during take-off at speed between 60 and 100 kt

▶ IF THREE REHEATS ONLY REQUIRED FOR TAKE-OFF

Take-Off may be continued providing the RTOW data has been prepared in anticipation of a reheat failure.

END//

▼ IF FOUR REHEATS REQUIRED FOR TAKE-OFF

THROTTLES .... IDLE C

Retard throttle levers (4) to idle and abandon the take-off

END//

●▶ CON light (amber) on during take-off between 100 kt and V1

N2 .... OBSERVE E

Observe N2 instrument of affected engine

▶ IF N2 is stable

Continue with the take-off

END//

▼ IF decreasing N2 indicates loss of engine power

THROTTLES .... IDLE C

Retard throttle levers (4) to idle and abandon the take-off

END//

●▶ CON light (amber) on during transonic acceleration (reheat selected)

FUEL FLOW & AREA .... COMPARE WITH OTHER ENGINES E

▶ IF FUEL FLOW and AREA indications sensibly in line

Continue normal operations
The FUEL FLOW and AREA sensibly in line with other engines indicates correct reheat operation.

END//

▼ IF FUEL FLOW and AREA indications not sensibly in line

REHEAT .... OFF THEN RHT E

Set the affected engine RHT selector to OFF then RHT in attempt to obtain reheat operation

If the CON light is accompanied by a REHEAT light, attempts to obtain reheat operation are unlikely to be successful

At least two reheat systems are required for transonic acceleration. If one or more reheat systems is lost, see Cruise Control Manual section 5 for en-route Fuel penalty.

END//

●▶ CON light (amber) on during use of reverse thrust

AREA .... OBSERVE E

Observe the primary nozzle area on the affected engine AREA indicator.

▶ IF AREA is less than 15%

Continued use of reverse thrust permitted

END//

▼ IF AREA is greater than 15%

IN FLIGHT .... CANCEL REVERSE THRUST C

Cancel reverse thrust on associated engine.

POWER PLANT

With the primary nozzle area greater than 15% overheating of the secondary nozzle could occur, even with the power at idle, because of the length of time use of reverse thrust is permitted in flight.

ON THE GROUND .... RESTRICT USE TO REVERSE IDLE C

Leave the affected engine throttle lever at reverse idle during use of reverse thrust

END//

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ENGINE FAILURE AT OR AFTER V1 IN THE TAKE-OFF PHASE OF FLIGHT

If decrease in N2 indicates loss of engine thrust

REHEAT .... ALL CTY E

Set the reheat selectors to CTY by use of ganging bar, observing N2 and EGT of engines not affected by thrust loss attain, but do not exceed, their contingency rating, T/O light off, CTY light on.

With the T/O MONITOR button pressed and REHEAT selected, should the N2 of any engine reduce to 58%, contingency rating will be selected automatically on all engines.

Automatic selection of contingency rating is indicated by the CTY light (yellow) flashing. Should the CTY light flash, select contingency rating by use of ganging bars immediately, in which case the CTY light remains on steady.

The contingency rating is selected by depressing the latch on the upper ganging bar and using the upper and lower ganging bars to move the reheat selectors (4) to the CTY position. The selection of contingency rating on the unsound engine at this time is an acceptable procedure.

IF CONTINGENCY RATING N2 OR EGT LIMITS EXCEEDED

N2, EGT .... MAINTAIN WITHIN LIMITS E

Retard associated throttle lever to obtain contingency rating

Verify reheat selectors at CTY

WHEN 3 MIN FROM START OF TAKE-OFF ROLL

T/O MONITOR .... PULL P

Pull to disarm T/O MONITOR button

REHEAT .... ALL RHT E

Set the reheat selectors to RHT using ganging bar, observing N2 and EGT reduce to the take-off rating limits, CTY light off, T/O light ON.

Always use the upper ganging bar, which will latch at the RHT position, to move the reheat selectors from CTY to RHT, as it is possible to select the OFF position from CTY by individual selector selections.

contd.

IF N2 AND EGT DO NOT REDUCE TO T/O RATING LIMITS
THROTTLE MASTER .... OTHER LANE E

Set associated THROTTLE MASTER selector to other selection, MAIN or ALTERN.

WHEN 7.5 MIN FROM START OF TAKE-OFF ROLL
ENG RATING MODE .... FLIGHT E

Set the ENG RATING MODE switches to FLIGHT, observing N2 and EGT attain, but do not exceed, their reheated climb rating limits, CLB light on, T/O light off, MID light on, LO light off.

IF N2 AND EGT DO NOT REDUCE TO THE REHEATED CLIMB RATING
THROTTLE MASTER .... OTHER LANE E

Set associated THROTTLE MASTER selector to other selection, MAIN or ALTERN.

ENGINE CONTROL SCHEDULE .... NORMAL E

Verify ENGINE CONTROL SCHEDULE rotary selector at NORMAL

With the engine control schedule rotary selector at NORMAL the engine control schedule is prevented from alternating between F/O and HI should the throttle lever be adjusted around 95% of the open position when reheat is cancelled.

WHEN 22.5 MIN FROM START OF TAKE-OFF ROLL
REHEAT .... ALL OFF E

Set the reheat selectors to OFF, observing all RHT selected lights off, ENGINE CONTROL SCHEDULE, HI lights on.

Setting the reheat selectors to OFF is not possible by use of ganging bar. Individual selectors must be used.

IF ENGINE CONTROL SCHEDULE, HI LT(S) OFF
THROTTLE MASTER .... OTHER LANE E

Set the THROTTLE MASTER selector to other selection, MAIN or ALTERN.

All use of contingency rating must be logged.

END//

ENGINE OVERSPEED

N1 or N2 overspeed

THROTTLE .... IDLE C

Retard throttle lever of affected engine to idle

APPLY PROCEDURE: PRECAUTIONARY ENGINE SHUT DOWN

INCORRECT SECONDARY NOZZLE POSITION (WITHIN NORMAL FORWARD THRUST RANGE)

DURING TAXI CHECKS

If during the taxi checks one secondary nozzle is not within the range 18° - 24° but is between 10° and 27°, take-off is permitted providing full account is taken of the performance effects. The performance effects are obtained by referring to the Performance Manual Section 5, and the Cruise Control Manual Section 5.

LIMITATION

With one secondary nozzle bucket system inoperative, aircraft operation is permitted providing there is no brake failure on the same side.

Before take-off

Observe the position of the failed bucket.

Trip the bucket control c/b.

CIRCUIT BREAKER	PANEL	GRID REF
ENG 1 BUCKET CONT UNIT SUP	14-215	E12
ENG 2 BUCKET CONT UNIT SUP	13-215	G14
ENG 3 BUCKET CONT UNIT SUP	13-216	C 6
ENG 4 BUCKET CONT UNIT SUP	14-216	C 6

Reset the BCU C/B after take-off, before transonic acceleration.

NOTE

Tripping the Bucket unit circuit breaker enables the CLEAR TO GO light for affected engine to function irrespective of bucket position.

With the Bucket unit circuit breaker tripped the secondary nozzle position indicator will be off scale 0° end.

Use of reverse thrust

Reverse is inoperable on the affected engine, the use of reverse on the other engines should be as given in PROCEDURES AND TECHNIQUES "Engine Failures".

CONTINUE//

● ▶ IN FLIGHT

IF SECONDARY NOZZLE IS WITHIN THE RANGE 5° to 15°

No flight restrictions but see Cruise Control Manual section 5 for fuel penalty.

IF SECONDARY NOZZLE IS WITHIN THE RANGE 16° to 27°

Unrestricted subsonic operation is permitted. Supersonic flight is permitted but during transonic acceleration reheat must not be used on the associated engine. See Cruise Control Manual Section 5 for combined fuel penalty due one reheat inoperative and secondary nozzle not at optimum.

END//

SECONDARY AIR DOORS FAIL TO OPEN AFTER TAKE-OFF

SECONDARY AIR DOOR sel .... OPEN E

Set the SECONDARY AIR DOORS selector to OPEN observing the SECONDARY AIR DOORS MI reads OPEN.

IF SECONDARY AIR DOORS MI STILL FAILS TO READ OPEN

SPEED .... SUBSONIC C

Replan flight at subsonic speed

END//

CAUTION

IF THE SECONDARY AIR DOORS ARE NOT OPEN AT SPEEDS GREATER THAN M = 0.95 NACELLE OVERHEATING WILL OCCUR.

IF THE SECONDARY AIR DOORS ARE SHUT AT SPEEDS GREATER THAN M = 0.90/300 KT,AND AN ATTEMPT IS MADE TO OPEN THEM, AIR LOADING ON THE DOORS MAY CAUSE THE MOTOR DRIVE C/BS TO TRIP. IF THE C/BS SHOULD TRIP LEAVE THEM TRIPPED FOR A MINIMUM TIME OF 2 MINS TO ALLOW MOTOR COOLING, REDUCE SPEED TO LESS THAN M = 0.90/300 KT AND ATTEMPT DOOR OPENING.

HIGH OIL CONT LIGHT ON

OIL CONT .... OBSERVE E

Observe OIL CONT instrument indicates engine oil tank contents greater than 14.0 U.S. quarts.

Overfull warnings occasionally occur prior to engine starting, due to the characteristics of the engine oil system, but the warning should disappear by the time that the engine has attained idling conditions.

If the indicated oil contents exceeds 14.0 U.S. quarts then the level is likely to fluctuate between 14.0 and 17.0 U.S. quarts.

The increase in contents of the engine oil tank may be caused by fuel leaking into the engine oil system from the fuel cooled oil cooler, continued engine operation is permitted but incident must be reported.

END//

FALSE START

The FALSE START procedure may only be applied after 2 min has elapsed since previous operation of air turbine starter.

COND VALVE .... OFF E

Verify COND VALVE selector at OFF and observe COND VALVE MI shows crossline.

HP VALVE .... SHUT E

Verify HP VALVE switch at SHUT to prevent flooding the engine with fuel.

IGNITION rty sel .... BOTH E

Verify IGNITION rotary selector at BOTH

ENGINE DEBOW sw .... DEBOW E

Set ENGINE DEBOW switch to DEBOW and observe DEBOW switch light on.

START/RELIGHT sel .... START E

Set START/RELIGHT selector to START

Start clock

Observe START/RELIGHT selector is latched at START, START VALVE MI reads OPEN, ENGINE DEBOW switch light off, START PUMP light (yellow) on, N2 rises.

During the dry motoring cycle the air supply to the ram air turbine starter must be controlled to maintain N2 below 16% and duct pressure below 35 psig to prevent air turbine starter limitations being exceeded.

20 SEC AFTER SETTING START/RELIGHT SEL TO START

HP VALVE .... OPEN E

Set HP VALVE switch to OPEN and observe RH IGN and LH IGN lights (green) on, EGT rising.

▶ IF EGT NOT RISING WITHIN 8 SEC OF OPENING HP VALVE
HP VALVE .... SHUT E
START/RELIGHT sel .... OFF E
ENGINE DEBOW sw .... NORMAL E

contd.

Set HP VALVE switch to SHUT, START/RELIGHT selector to OFF and ENGINE DEBOW switch to NORMAL.

END//

IF EGT RISING

Continue as for normal engine start.

END//

POWER PLANT

The following drills are not published in expanded form.

Inadvertent Reverse Thrust - refer to abnormal drill 07.01.10
Inadvertent Forward Thrust - refer to abnormal drill 07.01.10
Aux Inlet MI Fails to Read Shut - refer to abnormal drill 07.01.15

FUEL JETTISON

CAUTION
WHERE POSSIBLE AVOID STORMY WEATHER CONDITIONS.
DO NOT ENTER A ZONE WHERE FUEL HAS RECENTLY BEEN JETTISONED.

SPEED .... NOT ABOVE M = 0.93 C

The maximum demonstrated speed for fuel jettisoning is M = 0.93.

REHEAT .... ALL OFF E

Verify all reheat selectors are OFF because the engine feed pumps cannot support reheated engine demand while fuel jettisoning from collector tanks.

TRIM TRANS AUTO MASTER .... OFF E

Verify the TRIM TRANS AUTO MASTER selector is at OFF to prevent interaction between trim transfer system and fuel jettisoning operation.

TANK 11 DE-AIR sw .... OFF E

Verify the TANK 11 DE-AIR switch is at OFF to prevent interaction between de-aeration and fuel jettisoning operation.

AFT TRIM sw .... NORM E

Verify the AFT TRIM switch is at NORM to ensure tanks 1 & 4 are returned to nominal values should fuel be transferred prior to jettisoning

TANK 9 CONTENTS .... LANDING QUANTITY E

Determine the landing quantity required in tank 9.

CAUTION
DURING JETTISON THE ONLY TRUE INDICATION OF FUEL QUANTITY ON BOARD IS THE TOTAL CONTENTS.
THE TOTAL FUEL REMAINING AND A/C WEIGHT INDICATORS DEPEND ON SIGNALS FROM THE ENGINE FLOWMETERS AND JETTISONED FUEL DOES NOT PASS THROUGH THEM.

NOTE

During jettison the aircraft weight will decrease at approximately 2000 kg per min.

JETTISON AS REQUIRED MAINTAINING CG WITHIN LIMITS. WHERE POSSIBLE TRIM TANK FUEL SHOULD BE JETTISONED BEFORE MAIN TANK FUEL.

TO JETTISON FROM TRIM TANKS

JETTISON MASTER VALVES .... OPEN E

Set the JETTISON MASTER VALVE selectors to OPEN.

TRIM TRANSFER PUMPS .... ON AS REQ'D E

Set the appropriate tank 9, 10, or 11 pumps to ON as required for jettison purposes and monitor contents of tank being jettisoned.

WHEN TANK 9 CONTENTS EQUAL LANDING QUANTITY

TANK 9 PUMPS .... AUTO E

Setting TANK 9 PUMP selectors to AUTO with the TRIM TRANS AUTO MASTER selector at OFF switches off the pumps.

WHEN TANK 10 & 11 CONTENTS AS REQUIRED

TANK 10 & 11 PUMPS .... AUTO E

Setting TANK 10 or TANK 11 PUMPS selectors to AUTO with the TRIM TRANS AUTO MASTER selector at OFF switches off the pumps.

TO JETTISON FROM MAIN TANKS

ENGINE FEED PUMPS .... ALL ON E

Verify all ENGINE FEED PUMP switches are at ON to ensure engine fuel feed is maintained during jettisoning.

MAIN TRANSFER TANK PUMPS .... ALL ON E

Set main transfer tanks 5, 7, 6 and 8 PUMP switches and selectors to ON if the associated tank contains at least 100 kg of fuel.

The auxiliary tanks 5A and 7A PUMP switches should also be set to on if these tanks contain fuel.

TRANS VALVES 5A-5, 7A-7 .... OPEN E

contd.

Set the TRANS VALVES 5A-5, 7A-7 switches to OPEN to allow transfer of fuel if their associated tanks contain fuel.

COLLECTOR TANK JETTISON VALVES .... OPEN E

Set tanks 1, 2, 3 and 4 jettison valve switches to OPEN.

JETTISON MASTER VALVES .... OPEN E

Set the JETTISON MASTER VALVE selectors to OPEN and monitor tank contents and TOTAL CONTENTS indicator.

WHEN TOTAL CONTENTS INDICATOR SHOWS THE REQUIRED QUANTITY

COLLECTOR TANK JETTISON VALVES .... SHUT E

Set tanks 1, 2, 3 and 4 jettison valve switches to SHUT.

JETTISON MASTER VALVES .... SHUT E

Set JETTISON MASTER VALVE selectors to SHUT to close the jettison master valves.

JETTISON MASTER VALVES MIs .... CROSSLINE E

Observe the JETTISON MASTER VALVES MIs show crossline indicating the jettison master valves are shut.

JETTISON MASTER VALVES .... OFF E

Set the JETTISON MASTER VALVES selectors to OFF to remove electrical power from the jettison master valves.

TOTAL FUEL REMAINING .... RESET TO AGREE
WITH TOTAL CONTENTS E

Since the fuel jettisoned is not automatically subtracted from the TOTAL FUEL REMAINING indicator it must be reset using the TOTAL CONTENTS indicator for reference.

A scan of the fuel panel should be carried out to ensure all pumps and valves are set appropriate to the phase of flight condition.

END//

TANK PRESS LIGHT ON

● WHEN AIRCRAFT IN CLIMB AND TANK PRESSURE INDICATION IN THE POSITIVE AMBER ARC

O/FULL LTS .... OBSERVE E

The TANK PRESS light may be on due to fuel entering the vent line from a tank that is being overfilled, observation of the O/FULL lights and SCAVENGE PUMP MI should confirm this.

IF O/FULL LTS ON
APPLY PROCEDURE: O/FULL LIGHT ON

IF O/FULL LTS OFF
REDUCE RATE OF CLIMB TO MAINTAIN TANK PRESSURE INDICATION WITHIN THE POSITIVE YELLOW OR GREEN ARC CE

At a high rate of climb the venting system may not reduce tank pressure fast enough, reducing the aircraft rate of climb should reduce tank to atmosphere differential pressure thereby putting off the TANK PRESS light.

END//

● WHEN AIRCRAFT IN CRUISE ABOVE 40,000 ft AND TANK PRESSURE INDICATION APPROXIMATELY ZERO

ENGINE FEED PUMPS .... ALL ON E

Verify all ENGINE FEED PUMP switches at ON and observe the ENGINE FEED PUMP LOW PRESS lights.

IF ONE PUMP LOW PRESS LT ON
ENGINE RECIRCULATION VALVE .... SHUT UNTIL THROTTLE IDLE E

Verify the ENGINE RECIRCULATION VALVE switch of associated engine is at SHUT, the switch must remain at SHUT until the throttle lever is retarded to idle during deceleration.

IF TWO PUMPS LOW PRESS LTS ON (IN ONE TANK)
ENGINE RECIRCULATION VALVE .... SHUT E

Verify the ENGINE RECIRCULATION VALVE switch of associated engine is at SHUT. The switch must remain at SHUT for the remainder of the flight.

ENGINE INLET LOW PRESS LTS .... MONITOR E

IF TWO OR MORE INLET LOW PRESS LTS ON
FLIGHT LEVEL .... 450 OR BELOW C

Atmospheric pressure at 45,000 ft is sufficient to

contd.

maintain normal engine feed.

IF LESS THAN TWO INLET LOW PRESS LTS ON
TANKS 1 & 4 .... 1500 KG MINIMUM E
TANKS 2 & 3 .... 2500 KG MINIMUM E

Maintaining 1500 KG in tanks 1 & 4 and 2500 KG in tanks 2 & 3 ensures sufficient head of fuel above the engine feed pumps to compensate for lack of tank pressure. However continued flight above 45,000 ft without pressurisation may result in the loss of up to 700 KG of the reserve fuel due to boiling.

IF QUANTITIES CANNOT BE MAINTAINED
FLIGHT LEVEL .... 450 OR BELOW C

If the 1500 kg in tanks 1 & 4 or the 2500 kg in tanks 2 & 3 cannot be maintained continue flight at 45,000 ft or below.

END//

●▶ WHEN AIRCRAFT IN DESCENT AND TANK PRESSURE INDICATION IN THE NEGATIVE AMBER ARC
REDUCE RATE OF DESCENT TO MAINTAIN TANK PRESSURE INDICATION IN NEGATIVE YELLOW OR AMBER ARC .... CE

Negative tank pressure is the result of the venting system being unable to cope with the aircraft rate of descent. Reducing the descent rate should reduce the tank to atmosphere differential pressure.

END//

MANAGEMENT WITH ABNORMALLY LOW FUEL QUANTITY

This procedure is intended for use when the fuel on the aircraft has been reduced to 6000 kg plus fuel for ballast and assumes the collector tanks contain equal quantities after forward transfer and tank 9 contains correct ballast fuel.
For maximum benefit this procedure should be initiated as early as possible in the descent. Five minutes after commencing the procedure and thereafter, the total useable fuel should be determined by addition of collector tank contents.

CROSSFEED rty sels .... INLINE E

Set all CROSSFEED valve rotary selectors inline to ensure all engines are being supplied by fuel remaining on aircraft, and observe CROSSFEED MIs inline.

MAIN TRANSFER PUMPS .... ALL ON E

Set tanks 5,6,7 and 8 pump switches and selectors to ON to scavenge any fuel remaining in these tanks.

TRANS VALVES 5A-5 & 7A-7 .... OPEN E

Set the TRANS-VALVE switch 5A-5 and 7A-7 to OPEN to enable any fuel in tanks 5A and 7A to be transfered.

TANKS 5A & 7A PUMPS ....ON E

Set tanks 5A and 7A pump switches to ON to scavenge any fuel remaining in these tanks.

The amount of fuel scavenged from tanks 5,5A,6,7,7A & 8 is approximately 300 kg.

WHEN LOW PRESS LTS ON.

TANK 5 & 6 LEFT HAND PUMPS .... OFF E
TANK 7 & 8 RIGHT HAND PUMPS .... OFF E

When all the main transfer pumps LOW PRESS lights are ON. Set tanks 5 & 6 left hand pumps and tanks 7 & 8 right hand pumps OFF, the remaining pump in each tank is left running to continue scavenge of tank.

CAUTION
BALLAST FUEL SHOULD BE USED ONLY IF THE SAFETY OF THE AIRCRAFT WOULD OTHERWISE BE PREJUDICED.

IF TRIM TANK FUEL IS TO BE USED

TANK 5 & 7 INLET VALVES .... OPEN E

Set tanks 5 & 7 INLET VALVES to OPEN to enable fuel to be transfered to these tanks.

TRIM TRANSFER PUMPS .... ALL ON E

Set the TRIM TRANSFER PUMPS in tanks containing fuel to ON.

TANK 6 & 8 STANDBY INLET VALVES ....OPEN E

Set TANK 6 & 8 STANDBY INLET VALVES to OPEN to enable fuel to be transfered into these tanks.

WHEN TANK 9 LOW PRESS LTS ON

TRIM PIPE DRAIN .... OPEN E

When the pump LOW PRESS lights for tank 9 come ON, set the TRIM PIPE DRAIN switch to OPEN. This will automatically set the scavenge pump running thereby draining the trim pipe of its fuel.

WHEN TANK 10 & 11 LOW PRESS LTS ON

TANK 9 & 11 INLET VALVES .... OPEN E

Set TANK 9 & 11 INLET VALVES to OPEN.

END//

NOTE
The total usable fuel should be determined by addition of the collector tank CONTENTS indication.

(Deletion)

CAUTION
ALL PUMPS AND VALVES SHOULD REMAIN AS SELECTED UNTIL AFTER LANDING.

FAILURE OF TANK 1&4 NORM MODE

Failure of tank(s) 1 and/or 4 to return to normal mode will be shown by TANKS 1 & 4 MI not reading NORM or their respective contents remaining at low level.

CROSSFEED .... TO USE FUEL FROM 2 AND/OR 3 E

Rotate the CROSSFEED selectors to supply engines 1 and 2 from tank 2, and/or engines 3 & 4 from tank 3 as appropriate.

STANDBY INLET VALVES ....OPEN E

Set to OPEN the STANDBY INLET VALVES switches of tank(s) affected by failure to return to normal mode.

SAME SIDE TANK 11 PUMP .... ON E

Set to ON the tank 11 PUMP selector(s) to enable fuel to be pumped into tanks 1 and/or 4 as appropriate.

WHEN COLLECTOR TANK(S) ABOVE UNDERFULL LEVEL

When tanks 1 and/or 4 contents greater than its underfull warning level (approximately 3400 kg).

TANK 11 PUMPS .... AUTO E

Set tank 11 PUMP selectors to AUTO

Setting TANK 11 PUMPS selector to AUTO with the TRIM TRANS AUTO MASTER selector at OFF switches off the pumps.

STANDBY INLET VALVES .... SHUT E

Set to SHUT the STANDBY INLET VALVES selectors of tanks 1 and/or 4 as appropriate.

WHEN TRIM TRANSFER IS COMPLETE
AND MAIN TRANSFER TANKS ARE EMPTY

CROSSFEED .... CEASE E

Verify all ENGINE FEED pumps are ON and rotate CROSSFEED rotary selectors crossline.

END//

(Unchanged)

FAILURE OF TANK 5 OR 7 PUMPS

● **BEFORE OR DURING ACCELERATING CLIMB**

IF 5-2 OR 7-4 PUMP FAILED

6-2 OR 8-4 PUMP ....OFF E

With a main transfer pump failed an underfull warning will occur in the affected collector tank soon after failure, the underfull warning may be ignored.

Pumps 6-2 and 8-4 will be on for de-aeration, switching them off ensures no inadvertent transfer from 6 or 8 can occur when the affected collector tank quantity falls to where it will demand fuel from tank 6 or 8.

6-1 or 8-3 PUMP .... ON E

Set 6-1 or 8-3 pump on as appropriate for tank de-aeration.

This ensures that the remaining pump in the affected main transfer tank will operate at altitude and is an insurance against the effects, on pumps start up, of a climb without de-aeration.

FAILED PUMP .... OFF E

Set failed pump 5-1 or 7-3 or 6-2 or 8-4 to OFF

IF TRIM TRANSFER IS NOT INTO 5 & 7

WHEN COLLECTOR TANK APPROACHES LOW LEVEL

APPROPRIATE TANK 6 OR 8 PUMP .... ON E

If there is no fuel transfer into tanks 5 & 7, wait until the collector tank affected by the failed transfer pump approaches or attains the LOW LEVEL warning then set the appropriate tank 6 or 8 pumps to ON to raise fuel level in collector tank.

IF TRIM TRANSFER IS INTO 5 & 7

MANAGE TRIM TRANSFER TO TOP UP AFFECTED COLLECTOR TANKS USING 5 & 7 MAIN INLET VALVES AND COLLECTOR TANK STANDBY INLET VALVES.............. E

To top up the affected collector tank during trim transfer set tank 5 or 7 MAIN INLET VALVE selector to SHUT and the affected collector tank STANDBY INLET VALVE switch to OPEN. When the collector tank at the desired level reverse the procedure.

FUEL SYSTEM

WHEN TRIM TRANSFER IS COMPLETE

5 & 7 MAIN INLET VALVES ....AUTO E

COLLECTOR TANK STANDBY
INLET VALVES ....SHUT E

When trim transfer complete set tank 5 & 7 MAIN INLET VALVES selector to AUTO and verify collector tank STANDBY INLET VALVE switches at SHUT in preparation for forward trim transfer.

CROSSFEED .... AS NECESSARY E

NOTE
Re-examine the situation when forward trim transfer is required.

END//

DURING STABILIZED CRUISE, DECELERATION OR DESCENT

FAILED PUMP .... OFF E

Set tank 5 or tank 7 failed pump to OFF.

IF TRIM TRANSFER IS NOT INTO 5 & 7
CROSSFEED ....AS NECESSARY E

IF TRIM TRANSFER IS INTO 5 & 7
MANAGE TRIM TRANSFER TO TOP UP AFFECTED
COLLECTOR TANK USING 5 & 7 MAIN INLET
VALVES AND COLLECTOR TANK STANDBY
INLET VALVES.. E

To top up collector tank during trim transfer set tank 5 or 7 MAIN INLET VALVE selector to SHUT and affected collector tank STANDBY INLET VALVE switch to OPEN. When collector tank at desired level reverse procedure.

WHEN TRIM TRANSFER IS COMPLETE

5 & 7 MAIN INLET VALVES .... AUTO E

COLLECTOR TANK STANDBY
INLET VALVES .... SHUT E

CROSSFEED .... AS NECESSARY E

When trim transfer complete set tank 5 & 7 MAIN INLET VALVES selector to AUTO and verify collector tank STANDBY INLET VALVE switches at SHUT in preparation for forward trim transfer.

During forward trim transfer re-examine the situation.

END//

FAILURE OF TANK 6 OR 8 PUMPS

● ▶ DURING TAKE OFF OR ACCELERATING CLIMB

▶ IF THE FAILED PUMP IS ON FOR DE-AERATION

REMAINING PUMP .... ON E

Set remaining pump switch in tank 6 or tank 8 to ON for de-aeration

This ensures that the affected pump in the affected main transfer tank will operate at altitude, and is an insurance against the effects, on pump start up, of a climb without de-aeration.

FAILED PUMP .... OFF E

Set tank 6 or tank 8 failed pump to OFF.

WHEN REHEAT OFF AND ENG RATING MODE sw AT FLIGHT

CROSSFEED .... AS NECESSARY E

Crossfeeding is not to be used during take off, the switching off of reheat and setting the ENG RATING MODE switch to FLIGHT is considered to be the end of the take off phase of flight enabling crossfeeding.

If the take off was with full tanks crossfeeding will not be necessary until transfer from tanks 6 and 8.

END//

● ▶ DURING STABILIZED CRUISE, DECELERATION OR DESCENT

FAILED PUMP .... OFF E

Set tank 6 or tank 8 failed pump to off.

CROSSFEED ....AS NECESSARY E

NOTE

If the forward trim transfer has not taken place re-examine the situation when it is required.

END//

FUEL SYSTEM

FAILURE OF TANK 9 PUMP

PUMPS AND VALVES IN
TRIM TRANSFER TANKS .... AUTO E

The actions contained in this drill are based on the pumps and valves in the trim transfer tanks being initially set to the AUTO position.

REARWARD TRIM TRANSFER IN PROGRESS

IF TANK 10 CONTENTS GREATER THAN TANK 9
TANK 9 FAILED PUMP .... OFF E

Automatic transfer will proceed with the remaining tank 9 pump and tank 10 pump.

END//

IF TANK 10 CONTENTS LESS THAN TANK 9
TANK 9 FAILED PUMP .... OFF E
SAME SIDE TANK 10 PUMP .... OFF E

Automatic transfer will proceed with the single tank 9 pump only.

Tank 9 and 11 QUANTITIES .... MONITOR E

WHEN TANK 11 QUANTITY REACHES TANK 11 LLC

SAME SIDE TANK 10 PUMP .... AUTO E

Setting tank 10 pump selector to AUTO brings the pump on-line.

TANK 9 AND 10 QUANTITIES .... MONITOR E

IF TANK 10 EMPTIES BEFORE TANK 9 AND THE
LEFT HAND TANK 9 PUMP HAS FAILED
OPERATING TANK 9 PUMP .... OFF E

Setting tank 9 PUMP selector to OFF stops the rearward transfer.

INTER-CON VALVE (5-8) .... OPEN E

Set INTER-CON VALVE (5-8) switch to OPEN and observe INTER-CON VALVE (5-8) MI reads OPEN.

ALLOW TANK 5 QUANTITY TO INCREASE BY HALF
THAT REMAINING IN TANK 9

WHEN QUANTITY IN TANK 5 IS AS REQUIRED

contd.

INTER-CON VALVE (5-8) .... SHUT E

Set INTER-CON VALVE (5-8) switch to SHUT and observe INTER CON VALVE (5-8) MI reads SHUT.

TANK 8 STANDBY INLET VALVE .... OPEN E
TANK 7 INLET VALVE MAIN sel .... SHUT E

Observe tank 7 INLET VALVE, MAIN MI shows crossline.

TANK 9 RIGHT HAND PUMP .... AUTO E

The preceding three actions enable the serviceable pump in tank 9 to transfer fuel from 9 to 8 only.

WHEN TANK 8 CONTENTS ARE RESTORED TO ORIGINAL

TANK 8 STANDBY INLET VALVE .... SHUT E
TANK 7 INLET VALVE MAIN sel .... AUTO E

Observe tank 7 INLET VALVE MI shows inline.

END//

IF TANK 10 EMPTIES BEFORE TANK 9 AND THE RIGHT HAND TANK 9 PUMP HAS FAILED

OPERATING TANK 9 PUMP .... OFF E

Setting tank 9 PUMP selector to OFF stops the rearward transfer.

INTER-CON VALVE (6-7) .... OPEN E

Set INTER-CON VALVE (6-7) switch to OPEN
Observe INTER-CON VALVE (6-7) MI reads OPEN

ALLOW TANK 7 QUANTITY TO INCREASE BY HALF THAT REMAINING IN TANK 9

WHEN QUANTITY IN TANK 7 IS AS REQUIRED

INTER-CON VALVE (6-7) .... SHUT E

Set INTER-CON VALVE (6-7) sw to SHUT
Observe INTER-CON VALVE (6-7) MI reads SHUT

TANK 6 STANDBY INLET VALVE .... OPEN E
TANK 5 INLET VALVE MAIN sel .... SHUT E

Observe tank 5 INLET VALVE, MAIN MI shows crossline.

TANK 9 LEFT HAND PUMP .... AUTO E

The preceding three actions enable the serviceable pump in tank 9 to transfer fuel from 9 to 6 only.

WHEN TANK 6 CONTENTS ARE RESTORED TO ORIGINAL

contd.

TANK 6 STANDBY INLET VALVE .... SHUT E
TANK 5 INLET VALVE MAIN sel .... AUTO E

Observe tank 5 INLET VALVE MI shows inline

END//

IF TANK 9 EMPTIES BEFORE TANK 10
RETURN TO NORMAL PROCEDURES

NOTE
Re-examine the situation when trim transfer fuel is required for topping up the collector tanks after a subsequent forward transfer.

END//

FUEL JETTISON IN PROGRESS

PROCEED WITH JETTISON USING THE REMAINING PUMP

END//

ABNORMAL CG POSITION

● ▶ AFT LIMIT

MACH NO .... INCREASE IF POSSIBLE C

Increase the Mach number if possible since the Mach number is too low for CG position.

FUEL FWD TRANS sw .... O/RIDE C

Set the FUEL FWD TRANS switch to O/RIDE since the CG position is too far aft for Mach number

Monitor the CG position.

TRIM TRANSFER PUMPS AND VALVES .... AUTO E

Verification of the auto control of the trim tank transfer pumps and valves is necessary to ensure that the FUEL FWD TRANS sw at O/RIDE will operate correctly.

TRIM TRANS AUTO MASTER .... OFF E

Setting the TRIM TRANS AUTO MASTER sel to OFF ensures that the transfer of fuel is solely under the control of the FUEL FWD TRANS sw.

WHEN NORMAL CG POSITION ACHIEVED
RETURN TO NORMAL TRANSFER CONTROL

When the normal CG position achieved set the FUEL FWD TRANS switch to its guarded position. Check tank 9 and tank 11 LLC preselected quantities and adjust if necessary before returning to normal transfer control.

END//

● ▶ FORWARD LIMIT

MACH NO .... DECREASE IF POSSIBLE C

Decreasing the Mach number will prevent any further rearward movement of the centre of pressure. Once any problem with the fuel transfer is overcome regain the flight plan speed as soon as possible to minimize the use of contingency fuel.

FUEL FWD TRANS sw .... OFF & GUARDED C

Verify the FUEL FWD TRANS switch is off and guarded, monitor the CG position.

TRIM TRANS AUTO MASTER .... OFF E

The trim transfer is stopped until the system status is checked, in particular, check that the fuel transfer from the main and auxiliary transfer tanks into the collector tanks is in accordance with normal procedures

IF TANK 9 or 10 CONTAINS FUEL

TRIM TRANSFER PUMPS .... AUTO E

Verify tanks 9 and 10 PUMP selectors and tank 11 INLET VALVES selectors at AUTO to ensure they are under control of the TRIM TRANS AUTO MASTER selector.

TANKS 9 & 11 LLC .... ADJUST E

Check the tanks 9 and 11 LLC preselected quantities and adjust if necessary.

TRIM TRANS AUTO MASTER .... REARWARD E

Set the TRIM TRANS AUTO MASTER selector to REARWARD since the CG position is too far forward for Mach number

WHEN NORMAL CG POSITION ACHIEVED
RETURN TO NORMAL TRANSFER CONTROL

When the normal CG position achieved set the TRIM TRANS AUTO MASTER selector to OFF and return to normal transfer control.

END//

IF TANKS 9 AND 10 EMPTY

TANK 11 INLET VALVES .... OPEN E

Set tank 11 INLET VALVES selectors to OPEN and verify tanks 5,7,6,8,9 and 10 INLET VALVES are shut.

TANK 2 & 3 JETTISON VALVES .... OPEN E

Set tanks 2 and 3 JETTISON valves to OPEN thereby transferring fuel into tank 11. Monitor increase in tank 11 contents to ensure correct transfer operation and movement of CG position.

FUEL SYSTEM

WHEN NORMAL CG POSITION ACHIEVED

TANK 11 INLET VALVES .... AUTO E
TANK 2 & 3 JETTISON VALVES .... SHUT E

Set tank 11 INLET VALVES selectors to AUTO and tank 2 and 3 JETTISON valves selectors to SHUT to stop transfer to tank 11.

RETURN TO NORMAL TRANSFER CONTROL

END//

FAILURE OF TANK 5A OR 7A PUMP

FAILED PUMP .... OFF E

Set each pump switch to OFF in turn observing the PUMPS LOW PRESS light.
The failed pump will be identified when its switch is at OFF and the light is OFF.
The imbalance of fuel during transfer by the failure of one pump is insignificant, ensure non-failed pump switch at ON.

END//

FAILURE OF TANK 10 PUMP

FAILED PUMP ....OFF E

Set tank 10 failed pump selector to OFF.

OPPOSITE SIDE TANK 9 INLET VALVE .... OPEN E

Set the tank 9 INLET VALVE selector on the opposite side of failed tank 10 pump to OPEN to allow transfer of fuel to tank 9.

FAILED SIDE TANK 9 PUMP .... ON E

Set the tank 9 PUMPS selector on the same side as the failed tank 10 pump to ON to deliver fuel to the failed side trim pipe.

CAUTION
REARWARD TRIM TRANSFER IS AT HALF RATE
MONITOR CG CLOSELY.

WHEN TANK 11 LOAD LIMIT IS REACHED

TANK 5 AND TANK 7
INLET VALVES ....AUTO/SHUT AS REQUIRED E

(Deletion)

When tank 11 LLC preset value achieved monitor transfer into tanks 5 and 7. Should imbalance occur, set the INLET VALVE of tank with higher content to SHUT until content equal.

WHEN TANK 10 BECOMES EMPTY

When tank 10 is empty its remaining pump will be switched OFF by the auto trim control.

WHEN TANK 9 BECOMES EMPTY

TANK 9 PUMPS AND
INLET VALVES .... AUTO E

TANK 5 & 7 INLET VALVES .... AUTO E

Set tank 9 PUMPS selectors and INLET VALVES selectors to AUTO and tanks 5 and 7 INLET VALVE selectors to AUTO to return pumps and valves to auto trim control.

TRIM TRANS AUTO MASTER .... OFF E

Set **TRIM TRANS AUTO MASTER** selector to OFF

END//

(Unchanged)

FAILURE OF A TANK 11 PUMP

ELECTRIC PUMP FAILED

FAILED PUMP .... OFF E

Set the failed pump selector to OFF.
If the left hand electric pump fails during de-aeration set the DE-AIR switch to OFF.

GREEN OR BLUE PUMP FAILED

FAILED PUMP .... OFF E

Set the failed PUMPS (GREEN OR BLUE) selector to OFF.

SAME SIDE ELECTRIC PUMP .... AUTO/ON AS REQD E

Set the PUMPS selector on same side as failed GREEN or BLUE pump to AUTO. If transfer under control of TRIM TRANS AUTO MASTER or ON if manual controlling. to ensure transfer rates and correct distribution after trim transfer.

O/FULL LIGHT ON

The overfull condition can be confirmed by the associated tank F.Q.I. indicating above nominal full value.

OVERFULL COLLECTOR TANK DURING MAIN TRANSFER

PUMP OF MAIN TANK
FEEDING COLLECTOR .... OFF E

Set the PUMPS selector/switch of main transfer pump feeding the collector tank with O/FULL warning to OFF.

IF O/FULL ON TANK 2 OR 4 DURING DE-AERATION OF TANKS 6 AND 8

TANK 6 OR 8 RIGHT HAND PUMP .... OFF E

Set tank 6 right hand PUMPS switch to OFF if O/FULL on tank 2 and tank 8 right hand PUMPS switch to OFF if O/FULL on tank 4. This is to rectify the possibility that the O/FULL warning may be due to inadvertent transfer.

TANK 6 OR 8 LEFT HAND PUMP ....ON E

Set the left hand PUMPS switch ON to ensure that the remaining pump in tank 6 or 8 will operate at altitude and is an insurance against the effects, on a pump start up of a climb without de-aeration.

WHEN THE U/FULL light ON

PUMP OF MAIN TANK
FEEDING COLLECTOR ....ON E

Set to ON the PUMPS selector/switch of main transfer tank feeding collector with U/FULL (underfull) warning and use the pump as necessary to keep O/FULL light off.

END//

OVERFULL TANK 5 OR 7 DURING TRANSFER FROM 5A OR 7A

TANK 5A OR 7A PUMPS .... OFF E

Set PUMPS switches (2) to OFF in tank 5A or 7A. The O/FULL light will go off when both pumps are switched off providing the inlet valve and standby inlet valve to the associated tank (5 or 7) are shut.

WHEN TANK 5 OR 7 CONTENTS FALLS

TANK 5A OR 7A PUMPS .... ON E

TEMPORARY REVISION
Insert facing 03.02 page 23

REASON FOR ISSUE:

To reduce possible fuel discharge in event of failure of trim transfer pipes.

When the contents of tank (5 OR 7) drops to enable further transfer to continue, set 5A or 7A pumps. Repeat procedure if O/FULL light comes on again.

END//

OVERFULL TANKS 5,7,9 or 11 DURING TRIM TRANSFER

AFFECTED TANK INLET VALVES .... SHUT E

Set INLET VALVE of tank with O/FULL warning to SHUT, observing valve MI.

IF INLET VALVES MI SHOWS CROSSLINE AND
O/FULL LIGHT REMAINS ON
SCAVENGE PUMP .... OBSERVE E

Observe SCAVENGE PUMP MI

IF SCAVENGE PUMP MI READS ON
Apply procedure : SUSPECTED LEAKAGE FROM MAIN
TRIM TRANSFER PIPE INTO TANK 11

IF INLET VALVE MI SHOW INLINE
APPROPRIATE TRIM TRANSFER PUMP ....OFF E

Set the trim transfer pump(s) feeding the tank with O/FULL warning to OFF.

WHEN TANK 5,7,9 or 11 CONTENTS FALLS

APPROPRIATE TRIM TRANSFER PUMP.......................... ON E

AFFECTED TANK INLET VALVES .... OPEN E

When the contents of tank (5,7,9 or 11) drops to enable further transfer to continue set the trim transfer pump(s) as appropriate to ON and open the affected tank INLET VALVES. Repeat procedure if O/FULL light comes on again.

WHEN TRIM TRANSFER COMPLETE

INLET VALVES sel .... AUTO E

TRIM PUMP sel .... AUTO E

On completion of trim transfer verify tank 5,7,9 and 11 inlet valves at AUTO and tank 9, 10 and 11 pumps at AUTO to return all trim pumps and valves under control the auto trim system.

END//

When the contents of tank (5 OR 7) drops to enable further transfer to continue, set 5A or 7A pumps. Repeat procedure if O/FULL light comes on again.

END//

OVERFULL TANKS 5,7,9 or 11 DURING TRIM TRANSFER

AFFECTED TANK INLET VALVES .... SHUT E

Set INLET VALVE of tank with O/FULL warning to SHUT, observing valve MI.

IF INLET VALVE MI SHOW INLINE

APPROPRIATE TRIM TRANSFER PUMP ....OFF E

Set the trim transfer pump(s) feeding the tank with O/FULL warning to OFF.

WHEN TANK 5,7,9 or 11 CONTENTS FALLS

APPROPRIATE TRIM TRANSFER PUMP .... ON E

AFFECTED TANK INLET VALVES .... OPEN E

When the contents of tank (5,7,9 or 11) drops to enable further transfer to continue set the trim transfer pump(s) as appropriate to ON and open the affected tank INLET VALVES. Repeat procedure if O/FULL light comes on again.

WHEN TRIM TRANSFER COMPLETE

INLET VALVES sel ....AUTO E

TRIM PUMP sel .... AUTO E

On completion of trim transfer verify tank 5,7,9 and 11 inlet valves at AUTO and tank 9,10 and 11 pumps at AUTO to return all trim pumps and valves under control of the auto trim system.

END//

ACC LIGHT ON

●▶ BEFORE TAKE OFF
RETURN TO RAMP .... E

END//

●▶ DURING FLIGHT
ENGINE FEED PUMPS sws ....ALL ON E

Verify all ENGINE FEED PUMP switches (12) set to ON and associated pump LOW PRESS lights off.

FAILURE OF AN ENGINE FEED PUMP

●▶ BEFORE TAKE OFF

Refer to MEL 05-02-14.

●▶ AFTER TAKE OFF

REMAINING PUMPS .... ON E

Verify remaining ENGINE FEED PUMP switches in tank set to ON

FAILED PUMP .... OFF E

END//

PRINTED
AND

(Unchanged)

FQI/CG ABNORMAL INDICATIONS

CG CHANNEL FAILURES

M light (amber) on

CG Channel .... 1 or 2 E

Set the CG channel rotary selector to 1 or 2 and monitor the indicated CG to ensure correct operation of the selected standby system.

END//

1 or 2 light (amber) on when M is selected

No action - remain selected at M.
If circumstances permit log any FQI with failure or suspect contents indication.

END//

M, 1 and 2 lights (amber) on

Apply procedure TOTAL LOSS OF CG DATA WITH TRIM TANK FQI SERVICEABLE

If circumstances permit log the following data:

Any control panel yellow warning light on. Any tank failure flag visible. ZFW & ZFCG reading. Reading of 1,M,2, CG on digital display. All tank contents and total contents indications together with phase of flight.

END//

COMPARATOR LIGHTS ON A CHANNEL (OR B)

Rotate the FQI test rotary selector to MIN A (or MIN B)
Set the FQI test switch to CANCEL.

(Deletion)

IF the A channel light remains on

Rotate the FQI test rotary selector to MAX A (or MAX B)
Set the FQI test switch to CANCEL.

If the A (or B) channel light remains on

9A or 9B Monitor tank 11 to verify auto transfer operating correctly.

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10A or 10B Monitor end of rearward transfer by tank 10 pump lights.

NOTE
The 9.10.11 Comparator lights are usually accompanied by a CGI or CG2 light.

END//

● ▶ LLC COMPARATOR LIGHT ON

Verify correct fuel transfer by observation of tank 9,10 and 11 FQIs.

END//

● ▶ IF 1 AND 4, OR 2 AND 3, OR 5 AND 7, OR 5A AND 7A OR 6 AND 8 COMPARATOR LIGHTS ON

Observe the CG channel lights to identify the faulty tank.

Channel 1 for tanks 1,2,5,5A and 6.
Channel 2 for tanks 3,4,7,7A and 8.

Set the FQI Test Switch to CANCEL.

If the difference in the affected tank contents are within the dead band the lights will go off.

The dead band is
Tanks 1 and 4 750 kg. Tanks 2 and 3 750 kg.
Tanks 5A and 7A 375 kg. Tanks 5 and 7 2000 kg.
Tanks 6 and 8 2700 kg.

END//

contd.

(Deletion)

PRINTED IN

FUEL SYSTEM

FUEL TANK CONTENTS INDICATOR FAILURE

●▶FAILURE FLAGS (BLACK) ON FQI

If tank 9,10 or 11 affected

Use the instrument pointer for content indication.

END//

●▶FAILURE FLAGS (RED AND BLACK) ON FQI

If tank 1,2,3 or 4 affected

During main transfer operation monitor the affected tank content by reference to the O/FULL,U/FULL and LOW LEVEL lights.

IF tank 5A or 7A, 6 and 8 affected

Assume tank empty when its pump LOW PRESS lights permanently on.

IF tank 5 or 7 affected

Assume tank empty when its pumps LOW PRESS lights permanently on.

During trim transfer use auto control between tanks 9,10,11 and manual control fuel into tanks 6 and 8.

END//

●▶FAILURE FLAG ON TOTAL CONTENTS INDICATOR, FLIGHT ENGINEERS AND/OR PILOTS

If any two collector tanks each with content less than 1000 kgs, the indication is correct.

If all collector tank levels above 1000 kgs, failed contents indication.

END//

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Unchanged

TEMPORARY REVISION
Insert facing 03.02. page 28

REASON FOR ISSUE:

To reduce possible fuel discharge in event of failure of trim transfer pipes.

FUEL SYSTEM

SUSPECTED LEAKAGE FROM MAIN TRIM TRANSFER PIPE INTO EQUIPMENT BAY FORWARD OF TANK 11.

TRIM PUMPS ....ALL OFF

Verify the TRIM TRANS AUTO MASTER sw at OFF and guarded.
Verify the PUMPS sels (8) of tanks, 9,10 and 11 at AUTO or OFF.
Verify tank 11 DE AIR sw at OFF.

INLET VALVES ....ALL SHUT

Verify the STANDBY INLET VALVES sws (9) at SHUT
Verify the INLET VALVE MAIN sels(6) of tanks 5,7,9 and 11 at AUTO or SHUT
Verify the INLET VALVE O/RIDE sels (6) of tanks 5,7,9 and 11 at OFF or SHUT

JETTISON VALVES ....ALL SHUT

Verify tanks 1,2,3 and 4 JETTISON VALVES sws (4) at SHUT
Verify JETTISON MASTER VALVES sws at OFF and MI show crossline

LEFT HAND TRIM PIPE ....CHECK

Set the tank 11 PUMP GREEN sel to ON
Monitor the tank 11 CONTENTS for up to 1 minute
Set the tank 11 PUMP GREEN sel to AUTO

IF THE TANK CONTENTS REDUCE BY MORE THAN 200 KG

Make no further use of the left hand trim pipe.

If necessary repeat the CHECK for the right hand trim pipe using tank 11 PUMP BLUE sel.

END//

CAUTION
If a significant leak is detected the total fuel on board should thereafter be determined from TOTAL CONTENTS and not from TOTAL FUEL REMAINING.

CAUTION
If the failure occurs during subsonic climb or before transonic fuel transfer remain subsonic.

TEMPORARY REVISION
(Continued)

FUEL SYSTEM

SUSPECTED LEAKAGE FROM MAIN TRIM TRANSFER PIPE INTO TANK 11.

NOTE

This procedure should only be used when it is firmly established that there is no leak into the equipment bay forward of tank 11.

TRIM PUMPS .... ALL OFF

Verify the TRIM TRANS AUTO MASTER sw at OFF and guarded.
Verify the PUMPS sels (8) of tanks, 9,10 and 11 at AUTO or OFF.
Verify tank 11 DE AIR sw at OFF.

INLET VALVES .... ALL SHUT

Verify the STANDBY INLET VALVES sws (9) at SHUT
Verify the INLET VALVE MAIN sels (6) of tanks 5,7,9 and 11 at AUTO or SHUT
Verify the INLET VALVE O/RIDE sels (6) of tanks 5,7,9, and 11 at OFF or SHUT

JETTISON VALVES .... ALL SHUT

Verify tanks 1,2,3 and 4 JETTISON VALVES sws (4) at SHUT
Verify JETTISON MASTER VALVES sws at OFF and MI show crossline

LEFT HAND TRIM PIPE .... CHECK

Set tank 9 left hand INLET VALVES sel to OPEN
Set the tank 9 or 10 left hand pump sel to ON
Set the tank 9 left hand INLET VALVES sel to AUTO
Monitor the tank 9 or 10 CONTENTS for up to 1 minute
Set the tank 9 or 10 left hand pump sel to OFF

IF THE TANK CONTENTS REDUCE BY MORE THAN 200 KG

Make no further use of the left hand trim pipe.

If necessary repeat the CHECK for the right hand trim pipe using tank 9 or 10 right hand pump.

END//

TEMPORARY REVISION
(Continued)

CAUTION
If a significant leak is detected the total fuel on board should thereafter be determined from TOTAL CONTENTS and not from TOTAL FUEL REMAINING.

CAUTION
If the failure occurs during subsonic climb or before transonic fuel transfer remain subsonic.

NOTE
The equipment bay could contain 4300 Kg of fuel and the cg may be 1.6% Co (0.8% Co at max weight) further aft than indicated.

Once the equipment bay is filled, it will take 25 minutes for the fuel quantity to fall to 2000 Kg and a further 90 minutes to drain completely.

FUEL SYSTEM

The following drills are not published in expanded form.

Total loss of CG data with trim tank FQI serviceable, refer abnormal drill Vo.II.07.02.10

Total loss of CG data one trim tank FQI unserviceable, refer abnormal drill Vol.II.07.02.13.

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LOSS OF BOTH ELECTRIC TRIM SYSTEMS

Refer to PROCEDURES AND TECHNIQUES

TOTAL LOSS OF ARTIFICIAL FEEL IN ONE AXIS

Refer to PROCEDURES AND TECHNIQUES

TOTAL LOSS OF AUTOSTABILIZATION IN ONE AXIS

Refer to PROCEDURES AND TECHNIQUES

LOSS OF CONTROL OF ONE INNER ELEVON

Refer to PROCEDURES AND TECHNIQUES

MECH JAM LIGHT ON

This procedure is not expanded
Refer to Abnormal drill Vol.II.07.03.04

FLYING CONTROL INVERTER FAILURE

This procedure is not expanded
Refer to Abnormal drill Vol.II.07.03.05

FLYING CONTROL SIGNALLING MODE CHANGE

Refer to PROCEDURES AND TECHNIQUES

LOSS OF ANTI-STALL SYSTEM(S)

CAUTION
IF TWO ANTI-STALL SYSTEMS ARE LOST THERE IS NO PROTECTION AGAINST HIGH INCIDENCE EXCURSIONS. SPECIAL CARE MUST BE TAKEN IN LOW SPEED FLIGHT.

If the aircraft speed is below 270 knots the loss of an anti-stall system is accompanied by the disengagement of the associated pitch autostabilization, except during an automatic approach with LOC, TRK and GLIDE captured.

If the failure is due to a power supply failure within the anti-stall system the pitch autostabilisation will not disengage.

FAILED ANTI-STALL SYSTEM .... OFF C

IF BOTH ANTI-STALL SYSTEMS ARE FAILED

WHEN THE SPEED IS 270 KTS OR LESS
PITCH AUTOSTAB (No.1 or No.2) .... ENGAGE C

With both ANTI-STALL SYSTEMS sws at OFF either one of the autostabilization pitch axes can be re-engaged below 270 knots.

AT LANDING
MINIMUM SPEED .... VREF + 10 C

NOTE
If the speed is increased from below 270 knots to above 270 knots, both pitch autostabilization axes should be re-engaged.

END//

LOSS OF ONE AUTOSTABILIZATION SYSTEM

AUTOSTAB PITCH and/or ROLL and/or YAW switches drop to OFF on one system.

If the aircraft speed is less than 270 knots and the PITCH AUTOSTAB fails, the associated ANTI-STALL system will fail.

REVERT TO MANUAL FLIGHT
OTHER AUTOPILOT ....ENGAGE C

The associated autopilot will have disengaged on AUTOSTAB disengagement.

DISENGAGED AUTOSTAB sws .... ENGAGE C

Transient fault signals may cause disengagement of the associated AUTOSTAB system.

IF THE PITCH AUTOSTAB DISENGAGES
APPLY PROCEDURE:LOSS OF ANTI-STALL SYSTEM

END//

LOSS OF ONE ARTIFICIAL FEEL SYSTEM
OR
ONE ARTIFICIAL FEEL JACK

FAILED SYSTEM .... IDENTIFY C

One ARTIFICIAL FEEL switch dropping to OFF indicates a loss of the associated jack, while all three switches on one system dropping to OFF indicate a loss of hydraulic pressure, an artificial feel computer malfunction or an ADC malfunction.

NOTE

If number 1 channel fails, the changeover to number 2 channel may be felt as a slight bump in the pilot control when the rocking lever swings from one position to the other position and the jack hits the stop.

END//

RELAY JACK BLUE JAM OR GREEN JAM

A relay jack jam will normally be accompanied by the disengagement of its associated autopilot. However if the relay jack jam occurs when both autopilots are engaged in LAND mode, a blue spool valve jam will be accompanied by a changeover of control from autopilot 1 to autopilot 2 and disengagement of autopilot 1, but in the event of a green spool valve jam the autopilot control will not change and both autopilots will remain engaged.

RELAY JACK sel .... TOWARDS JAM LT   C

Pull and set the RELAY JACK selector towards the setting associated with the illuminated JAM light i.e.
BLUE ONLY if GREEN JAM light is on.
GREEN ONLY if BLUE JAM light is on.
This action confirms the automatic depressurization of the failed ram and switches off the JAM light and the MWS PFC lights.

IF PRIOR TO THE WARNING BOTH AUTOPILOTS WERE ENGAGED AND THE WARNING WAS A BLUE JAM LT ON

RELAY JACK sel .... NORM   C

If the JAM light remains off this indicates a false warning provoked by No. 1 autopilot disengagement.

IF THE JAM LIGHT COMES ON AGAIN

RELAY JACK sel .... TOWARDS JAM LT   C

WHENEVER NECESSARY

AP LT .... CANCEL   C

Press the autopilot instinctive disconnect button on the control wheel and observe the AP light off.

OTHER AUTOPILOT .... ENGAGE   C

END//

HYDRAULIC TANK LOW LEVEL

●▶ LOW LEVEL IN YELLOW TANK ALONE

WHEN YELLOW CONTENTS LESS THAN 1 US GALL

YELLOW PUMPS sw .... MAN E

Providing the yellow pumps selectors are at AUTO unguarding and setting the YELLOW PUMPS switch to MAN offloads yellow pumps, making yellow system pressure reduce to zero.

This action is carried out when there is no simultaneous low level warning in GREEN or BLUE tank.

END//

●▶ LOW LEVEL IN BLUE OR GREEN TANK
(with or without yellow low level)

AFFECTED AIR INTAKES HYD sel .... YELLOW E

Set the intake HYD selectors, for the intakes with HYD lights on, to YELLOW to confirm auto-change, and observe the HYD lights.

When an hydraulic tank low level warning is given an automatic onloading of yellow pumps, and a changeover of the affected intakes hydraulic supplies to the yellow system occurs.
If the warning is for the blue tank intakes 3 and 4 supplies change.
If warning is for the green tank intakes 1 and 2 supplies change. The intake HYD lights will be on for the affected intakes.

ALL TANK CONTENTS .... MONITOR E

Monitor the contents of all tanks.

▶ IF YELLOW LEVEL FALLS OR L/LEVEL LT ON
MAXIMUM SPEED .... SUBSONIC C

REDUCE SPEED TO SUBSONIC

IF INTAKE HYD LT ON OR
SPEED SUBSONIC
RAMP SPILL MASTER .... MAN E

Set the RAMP SPILL MASTER switches of intakes being supplied by yellow hydraulic system to MAN.

A low level in blue or green tank followed by a low level in yellow after intake supply changeover indicates the leak of fluid is from an intake system. Setting the RAMP

(Unchanged)

contd.

HYDRAULIC POWER

SPILL MASTER switches to MAN cuts off hydraulic supplies to the associated intake and brings on the INTAKE lights (red).

APPLY PROCEDURE : INTAKE LIGHT ON

IF BLUE OR GREEN LEVEL CONTINUES TO FALL
RELAY JACK sel .... TOWARDS SERVICEABLE SYSTEM C

If the level of green or blue tank falls after changing intake supplies to yellow system, set the RELAY JACK selector to GREEN ONLY if leak is in blue tank and BLUE ONLY if leak is in green tank thereby isolating the blue or green hydraulic supplies from the relay jacks.

A GREEN ONLY selection will disengage No. 1 autopilot
A BLUE ONLY selection will disengage No. 2 autopilot

IF BLUE OR GREEN LEVEL CONTINUES TO FALL
RELAY JACK sel .... NORM C

Set the RELAY JACK selector to NORM thereby restoring availability of autopilots.

SERVO CONTROL YELLOW rty sel .... YELLOW BLUE OR YELLOW GREEN C

If the blue or green level continues to fall pull and rotate the rotary selector toward the appropriate position YELLOW/BLUE if blue level falling YELLOW/GREEN if green level falling.

This isolates the green or blue hydraulic system from flying controls and replaces it by yellow system
Monitor YELLOW tank level.

IF YELLOW LEVEL FALLS
AWAIT FLYING CONTROL SYSTEM ISOLATION

If yellow system level falls after changeover of flying controls hydraulic supplies, wait until the yellow supply is automatically isolated from flying control by yellow tanks first low level warning.

APPLY PROCEDURE : LOW HYDRAULIC PRESSURE
AT FLYING CONTROLS

IF BLUE OR GREEN LEVEL CONTINUES TO FALL
HYD PUMPS OF AFFECTED SYSTEM .... OFF E

Set the hydraulic pump selectors of leaking system to OFF.

END//

A complete summary of the effects of loss of hydraulic systems is given in the CHECKLISTS VOL.II.07.04.05/06.

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(Completely Revised)

YELLOW HYD FLUID O/HEAT AND/OR O/PRESS

PRESSURE GREATER THAN 4500 PSI
PUMP sels (2) .... ON   E

Set yellow pumps selectors to ON to ensure both pumps are not inadvertently off-loaded during drill.
A pressure greater than 4500 psi may be cause of O/HEAT condition.

YELLOW PUMPS sw .... MAN   E

Unguard and set YELLOW PUMPS switch to MAN making the AUTO position of yellow pumps selectors an OFF position

LH PUMP sel .... AUTO   E

Set the left hand yellow pump selector to AUTO, this position off-loads the left hand pump, observe the yellow system pressure gauge. If the pressure reduces to normal leave the left hand pump selector at AUTO and continue system operation on single pump.

IF PRESSURE REMAINS GREATER THAN 4500 PSI
LH PUMP sel .... SHUT   E

The pressure remaining greater than 4500 psi may be caused by the left hand pump failing to off-load when switched off, or the right hand pump.
Setting the left hand pump selector to SHUT stops all output from the pump if the pressure remains greater than 4500 psi the pump giving the over pressure is the right hand pump

IF PRESSURE REMAINS GREATER THAN 4500 PSI
LH PUMP sel .... ON   E

Set the left hand pump selector to ON to onload the pump, and set the guard.

RH PUMP sel ....AUTO   E

Set the right hand pump selector to AUTO to off-load the pump, this should reduce system pressure.

IF PRESSURE REMAINS GREATER THAN 4500 PSI
RH PUMP sel .... SHUT   E

Set the right hand pump selector to SHUT to stop all output from the pump.

END//

(Unchanged)

CAUTION
IF A PUMP SELECTOR HAS REMAINED AT SHUT FOR LONGER THAN 30 MINUTES DO NOT BRING THIS PUMP BACK INTO USE.

● ▶ PRESSURE NORMAL (4000 PSI) OR PRESSURE GAUGE U/S

YELLOW PUMPS sw ....MAN E

Unguard and set YELLOW PUMPS switch to MAN making the AUTO position of yellow pumps selectors an OFF position.

PUMP SELS (2) .... AUTO E

Set both yellow pumps selectors to AUTO, to off-load the yellow pumps and reduce yellow system pressure to zero.

END//

BLUE/GREEN HYD FLUID O/HEAT AND/OR O/PRESS

PRESSURE GREATER THAN 4500 PSI

LH PUMP sel .... OFF E

Set the left hand pump selector of system with overpressure to OFF, observe the associated system pressure gauge, if system pressure reduces to normal, leave the left hand pump selector to OFF and continue system operation on single pump.

IF PRESSURE REMAINS GREATER THAN 4500 PSI

LH PUMP sel ....SHUT E

The pressure remaining greater than 4500 psi may be caused by the left hand pump failing to off-load when switched off or the right hand pump.
Setting the left hand pump selector to SHUT stops all output from the pump, if the pressure remains greater than 4500 psi the pump giving the overpressure is the right hand pump.

IF PRESSURE REMAINS GREATER THAN 4500 PSI

LH PUMP sel .... ON E

Set the left hand pump selector to ON to on load the pump, and set the guard.

RH PUMP sel .... OFF E

Set the right hand pump selector to OFF observe the associated system pressure gauge, if system pressure reduces to normal leave the right hand pump selector at OFF and continue system operation on single pump

IF PRESSURE REMAINS GREATER THAN 4500 PSI

RH PUMP sel ....SHUT E

Set the right hand pump selector to SHUT to stop all output from the pump

END//

CAUTION
IF A PUMP SELECTOR HAS REMAINED AT SHUT FOR LONGER THAN 30 MINUTES DO NOT BRING THIS PUMP BACK INTO USE.

(Unchanged)

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●▶ PRESSURE NORMAL (4000 PSI) OR PRESSURE GAUGE U/S

HYD SELS FOR AFFECTED INTAKES ....YELLOW E

Set the affected intake HYD selectors to YELLOW, if overheat in green system set intakes 1 and 2 to YELLOW and if overheat is in blue system set intakes 3 and 4 to YELLOW

SERVO CONTROLS YELLOW rty sel ....YELLOW GREEN
OR YELLOW BLUE C

Pull and rotate the SERVO CONTROLS YELLOW rotary selector towards the system with O/HEAT warning.
Observe yellow system pressure normal.

PUMP SELS FOR AFFECTED SYSTEM .... OFF E

Set the PUMP selectors for system with O/HEAT warning to OFF.

END//

HYDRAULIC PUMP LOW PRESSURE

●▶ BLUE OR GREEN PUMP LOW PRESSURE

FAILED PUMP .... OFF E

Set failed pump selector to OFF

IF FLYING CONTROLS IN GREEN ELECTRIC SIGNALLING MODE
WHEN LANDING GEAR LOWERING REQUIRED.
APPLY PROCEDURE : LANDING GEAR STANDBY LOWERING.

The landing gear is lowered using the standby system to prevent signalling lane change which would occur due to green pressure reduction with gear lowering.

END//

●▶ YELLOW PUMP LOW PRESSURE

NON-FAILED PUMP .... ON E

Set non-failed pump selector to ON to prevent inadvertent off-loading.

FAILED PUMP .... AUTO E

Verify the failed pump selector at AUTO.

YELLOW PUMPS sw .... MAN E

Unguard and set the YELLOW PUMPS switch to MAN to off-load the failed pump.

END//

NOTE

With the YELLOW PUMPS switch at MAN the non failed selector is to remain in the ON position to keep system pressurised. This provides for continued operation and auto change to the standby system should a subsequent failure of a main hydraulic system occur.

(unchanged)

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ADC FAILURE

If transient failure of an ADC occurs it may be possible to regain it by reset action. At least two seconds must elapse after failure indication before reset is effective.

ASI & ALTIMETER.............................. STANDBY MODE CP

Rotate Captain's or First Officer's ASI and Altimeter mode selector to S (standby).
When at S (standby) the ASI and Altimeter receive information from the nose pitot probe.

FAILED ADC .... OFF P

Set the failed ADC switch to off and monitor the performance of the engaged ADC by comparison with the standby airspeed, altitude and Mach data and general monitoring of other indicators to confirm the validity of the incidence data.

NOTE

If when flying with only one ADC operative, a difference is detected between the standby data and the ADC data, in certain phases of flight (especially at high Mach number) it may be difficult to decide which of the systems is at fault. In these circumstances reference to the air intake fault detection system sensor unit failure lights may assist in determining which system is at fault, since this system monitors the output of the flight instrument pitot/static data sources.

Failed System	Indication
Nose Probe	SU2
ADC 1	SU1
ADC 2	SU3 or SU4

AFFECTED AUTOSTAB.................................... OFF P

Set associated AUTOSTAB switches (3) to OFF

AFFECTED ANTI-STALL SYSTEM .... OFF P

Set associated ANTI-STALL SYSTEM switch to OFF

npletely(vised)

NAVIGATION SYSTEM

TRANSPONDER ALT RPTG .... OPERATING ADC P

This ensures that the altitude output of ATC TRANSPONDER is supplied by the serviceable ADC.

IF A SYMMETRIC PAIR OF ENGINES EXCEED OPERATING CRUISE RATING AT STATIC TEMPERATURES COLDER THAN -51 DEG.C

THROTTLE MASTERS .... OTHER LANE E

Set THROTTLE MASTER selectors for affected engines to opposite selection, MAIN or ALTERN.

SECONDARY AIR DOORS .... ABOVE 220 KT OPEN
BELOW 220 KT SHUT E

Set the SECONDARY AIR DOORS selectors to OPEN at speeds greater than 220 KT and to SHUT at speeds less than 220 KT.

MAXIMUM SPEED .... VMO MINUS 10 KT
MMO MINUS .05M C

This limitation is necessary because the ADC comparator function is lost with one ADC off.

END//

CAUTION

1. DO NOT USE THE AUTOPILOT IN MAX SPEED MODES DUE TO RISK OF A DRIFT IN LIMIT SPEED DATA GOING UNDETECTED.

2. DO NOT RE-ENGAGE THE ANTI-STALL SYSTEM ASSOCIATED WITH THE FAULTY ADC.

3. AFTER LOSS OF ADC 1, NO.1 AUTOSTAB SHOULD NOT BE RE-ENGAGED UNLESS NO.2 AUTOSTAB FAILS.

A complete summary of the effects of ADC failure is given in the CHECKLISTS Vol. 2B 07.05.04/07.

FAILURE OF CAROUSEL INS

STANDBY HORIZON .... USE C

Use the STANDBY HORIZON until it is established that information on ADI is correct.

FAILED INS .... IDENTIFY CP

Identify the failed INS by reference to the INS annunciator lights.

IF INS 1 OR INS 2 FAILED
ATT INS sw .... INS 3 CP

Set the ATT/INS switch to INS 3 to transfer the attitude source for the ADI to a serviceable INS and observe the G flag disappears. The weather radar system associated with the failed INS should not be used.

CLEAR ANY REMAINING FLAGS BY
APPROPRIATE SWITCH ACTION

To assist in the clearance of any remaining warning flags by the appropriate switch action: consult procedure NAVIGATION SYSTEM ABNORMAL INDICATIONS

CDU DATA sel .... DSRTK/STS CP

Rotate DATA selector on failed INS to DSRTK/STS position in preparation for tests.

TEST pb ....PRESS AND RELEASE CP

Press and release the TEST push button and observe action code display

IF ACTION CODE RETURNS
01 CODE .... OFF E

If action code 01 returns shut down the associated INS.

02 CODE .... ATT E

If action code 02 returns set the MSU rty sel to ATT.

03 CODE........................ ATT IF NAV DATA DEGRADES E

If action code 03 returns watch data displays and flight instruments for degradation.
Select ATT mode if necessary.

04 CODE - GROUND OPERATION ONLY

With aircraft on ground and stationary select STBY and carry out full loading procedure.

contd.

05 CODE .... CHECK MAL CODE CP

If action code 05 returns press TEST button and observe malfunction code

▶ IF MAL CODE 55
NAV AID DATA .... RELOAD CP
Reload NAV AID data via the ADEU

06 CODE .... CHECK MAL CODE CP
If action code 06 returns press TEST button and observe malfunction code

▶ IF MAL CODE 41 OR 43
PRESENT POSITION .... RELOAD CP

IF MAL CODE 49
MANUAL UPDATE .... CHECK AND FLUSH IF NECESSARY CP

Check the accuracy of the manual update and if necessary remove the update using the flushing procedure

END//

IF ACTION CODE DOES NOT RETURN
FLIGHT SYSTEM SWITCHES .... NORMAL CP

END//

NOTE

1. When an INS is set to ATT the Flight Director,Autopilot (except in INS and TRK modes) and Autothrottle may be used providing the associated compass coupler is supplied by INS 3 with INS 3 in NAV mode.

2.

If INS 1 switched OFF	AP/FD 1, AT 1 and weather radar No.1 stabilisation are lost.
If INS 2 switched OFF	AP/FD 2,AT 2 and weather radar No.2 stabilisation are lost.

NAVIGATION SYSTEM ABNORMAL INDICATIONS

●▶ G flag visible on ADI

ATT/INS sw .... INS 3 C/P

Set the ATT INS switch to INS 3 to obtain the attitude source for the ADI from a serviceable INS and observe the G flag disappears.

The weather radar system associated with the failed INS should not be used.

END//

●▶ ADI CHECK ATT lts (amber) on

STANDBY HORIZON .... CROSSCHECK AGAINST ADIs C/P

The malfunctioning ADI may have a G flag in view.

ATT INS sw .... INS 3 C/P

Set the ATT INS switch to INS 3 to obtain the attitude source for the ADI from a serviceable INS and observe the CHECK ATT lights off.

The weather radar system associated with the failed INS should not be used.

END//

●▶ HDG flag visible on HSI

(With RAD INS switch at INS)

NAV INS sw ....OTHER INS C/P

Set the NAV INS switch to NAV INS 1 or NAV INS 2 to obtain the navigational and true heading data from a serviceable INS and observe the HDG flag disappears.

(With RAD INS switch at RAD)

COMP sw ....OTHER SYSTEM C/P

Set the COMP switch to COMP 1 or COMP 2 to obtain the magnetic heading data from a serviceable compass coupler and observe HDG flag disappears.

END//

●▶ HSI HDG lts (amber) on

(With RAD INS switch at RAD)

Since there are only two compass systems, it may be difficult to determine the malfunctioning compass if no HDG flag visible or INS WARN light on.

Compare the standby compass with the HSI compass cards and observe the compass controller synchronization annunciator The unserviceable compass will probably be out of synch. As a last resort true headings of the INS may be crosschecked and then corrected for chart magnetic heading.

COMP sw ....OTHER SYSTEM C/P

Set the COMP switch to COMP 1 or COMP 2 to obtain the magnetic heading data from a serviceable compass coupler and observe both HDG lights off.

(With RAD INS switch at INS)

Compare the INS for true headings

NAV INS sw ....OTHER INS C/P

Set the NAV INS switch to NAV INS 1 or NAV INS 2 to obtain the navigational and true heading data from a serviceable INS and observe both HDG lights off.

END//

●▶ Heading Failure flag visible on RMI

COMP sw ....OTHER SYSTEM C/P

Set the COMP switch to COMP 1 or COMP 2 to obtain the magnetic heading data from a serviceable compass coupler and observe Heading failure flag disappears.

END//

●▶ Navigation flag visible on HSI

(With RAD INS switch at INS)

NAV INS sw ....OTHER INS C/P

Set the NAV INS switch to NAV INS 1 or NAV INS 2 to transfer the navigational and true heading data from a serviceable INS and observe the Navigation flag disappears.

(With RAD INS switch at RAD)

DEV sw ....OTHER SYSTEM C/P

Set the DEV switch to DEV 1 or DEV 2 to obtain the supply of HSI data from a serviceable VOR and/or ILS receiver and observe Navigation flag disappears.

END//

●▶ G/S flag visible on HSI and ADI

DEV sw ....OTHER SYSTEM C/P

Set the DEV switch to DEV 1 or DEV 2 to obtain the supply of glide slope data from a serviceable ILS receiver and observe G/S flag disappears.

END//

●▶ LOC flag visible in ADI

DEV sw ....OTHER SYSTEM C/P

Set the DEV switch to DEV 1 or DEV 2 to obtain the supply of localiser data from a serviceable ILS receiver and observe LOC flag disappears.

END//

●▶ Position Discrepancy is noted between INS

Discrepancy on INS 1 or INS 2

NAV INS sw ....OTHER INS C/P

Set the NAV INS switch to NAV INS 1 or INS 2 to obtain the navigational data from a serviceable INS.

CAUTION
DO NOT USE AP 1 (OR AP 2) IN INS MODE

Discrepancy in INS 3.

No action.

END//

●▶ INS COMP lt (amber) on

The comparison of INS data is inhibited, the attitude and navigation data must therefore be monitored by the crew.

END//

INTENTIONALLY LEFT BLANK

AC MAIN BUS LIGHT ON

If No.3 a.c. main busbar fails ADC 2 will be lost, This causes a spurious overspeed warning which can be cancelled by switching off ADC No.2.

It is possible that a single a.c. main busbar fault will momentarily cause a failure of the other a.c. main busbars.

ENGINE FEED PUMPS .... ALL ON E

Verify all ENGINE FEED PUMPS are switched ON as a precaution, since loss of an a.c. busbar will lose some feed pump supplies.

BTB sel .... TRIP E

Set the associated BTB selector to TRIP to confirm auto disconnect.

An a.c. main busbar fault will automatically trip the BTB and thus disconnect the affected busbar from the other a.c. main busbars.

GENERATOR .... TEST
CHECK VOLTS
& FREQUENCY E

Set the associated generator selector to TEST and the AC FREQ/VOLTS selector to the GEN number of the affected channel.
The frequency and volts should be observed normal.

Systems data:

AC frequency	396 to 404 Hz
AC volts	110 to 118 volts

An a.c. main busbar fault will automatically open the GCB and thus disconnect the affected generator from its associated a.c. main busbar.

IF VOLTS AND/OR FREQUENCY ARE ABNORMAL

GENERATOR .... OFF E

Set the associated generator selector to OFF.

Observe the associated GEN light (amber) is on, the associated GCB MI shows crossline, the KW KVAR meter reads 0 and the KW indications on the remaining generators are within limits.

contd.

SSB sw .... OPEN E

Set The SSB switch to OPEN thereby isolating No.1 and No.2 a.c. main busbars from No.3 and No.4 main busbars.

With an a.c. main busbar dead and the associated BTB open, setting the SSB switch to OPEN ensures that when the BTB selector is subsequently placed to RESET, the two busbars on the other side of the aircraft cannot be affected by any latent fault in the dead busbar.

BTB sel .... RESET E

Set the BTB selector to RESET and release, observe the AC MAIN BUS light off and the BTB MI inline.

CAUTION
WHEN THE BUSBAR SUPPLY HAS BEEN RECOVERED BY THE BTB SWITCH ACTION, THE ASSOCIATED GENERATOR MUST NOT BE RESELECTED.

IF AC MAIN BUS LIGHT ON, BTB MI CROSSLINE

BTB sel .... TRIP E

Set the BTB selector to TRIP thereby disconnecting the associated a.c. main busbar from the others, observe GEN light (amber) on and GCB and BTB MIs crossline.

SSB sw .... CLOSE E

Set the SSB switch to CLOSE to automatically parallel generators when voltage and frequency compatible, observe SSB MI inline.

NOTE
One a.c. main busbar has been lost.
Loss of a.c. main bus No.2 also loses busbars 10x and 12x.
Loss of a.c. main bus No.3 also loses busbars 11x and 13x.

IF NO 3 AC MAIN BUS LT ON

AIR INTAKE LANE rty sels .... 2 TO B
3 TO A E

With the AIR INTAKE LANE rotary selector for intake No.3 at the non-auto A position and intake No.2 at non-auto B position, the A control lane of intake No.3 and the B control lane of intake No.2 are powered from the a.c. essential busbars.

contd.

ELECTRICAL

IF NO 4 AC MAIN BUS LT ON

AIR INTAKE LANE rty sels .... 1 TO A
4 TO B E

With the AIR INTAKE LANE rotary selector for intake No. 1 at the non-auto A position and intake No.4 at the non-auto B position, the A control lane of intake No.1 and the B control lane of intake No.4 are powered from the a.c. essential busbars

END//

IF AC MAIN BUS LT OFF, BTB MI INLINE

SSB sw .... CLOSE E

Set the SSB switch to CLOSE to automatically parallel generators when voltage and frequency compatible, observe SSB MI inline.

EMERG GEN NORM/ISOL sw .... ISOL THEN NORM E

Set the EMERG GEN NORM/ISOL switch to ISOL for five seconds to switch off the emergency generator then return switch to NORM, observe SELECTED light off.

Failure of an a.c. main busbar automatically switches on the emergency generator which remains latched on until switched off by momentarily selecting ISOL.

ENGINE FEED PUMPS .... AS REQUIRED E

Set the ENGINE FEED PUMPS switches to agree with pump condition.

END//

IF VOLTS AND FREQUENCY ARE NORMAL

GENERATOR .... ON E

Set the generator selector to ON to connect its output to its a.c. main busbar.

The GEN light should be observed off.

IF AC MAIN BUS LT ON

GENERATOR .... OFF E

Set the associated generator selector to OFF.

Observe the associated GEN light (amber) is on, the associated GCB MI shows crossline, the KW KVAR meter reads 0 and the KW indications on the remaining generators are within limits.

SSB sw .... OPEN E

Set the SSB switch to OPEN thereby isolating No.1 and

contd.

ELECTRICAL

No.2 a.c. main busbars from No.3 and No.4 a.c. main busbars.

With an a.c. main busbar dead and the associated BTB open, setting the SSB switch to OPEN ensures that when the BTB selector is subsequently placed to RESET, the two busbars on the other side of the aircraft cannot be affected by any latent fault in the dead busbar.

BTB sel .... RESET E

Set the BTB selector to RESET and release.
The AC MAIN BUS light should be observed off and the BTB MI inline.

CAUTION
WHEN THE BUSBAR SUPPLY HAS BEEN RECOVERED BY THE BTB SWITCH ACTION, THE ASSOCIATED GENERATOR MUST NOT BE RESELECTED

▶ IF AC MAIN BUS LIGHT ON, BTB MI CROSSLINE

BTB sel .... TRIP E

Set the associated BTB selector to TRIP to confirm auto disconnect.

The GEN light (amber) should be observed on, the GCB and BTB MIs crossline.

SSB sw .... CLOSE E

Set the SSB switch to CLOSE to automatically parallel generators, when voltage and frequency compatible, observe SSB MI inline.

NOTE
One a.c. main busbar has been lost.
Loss of a.c. main bus No.2 also loses busbars 10x and 12x.
Loss of a.c. main bus No.3 also loses busbars 11x and 13x.

▶ IF NO.3 AC MAIN BUS LT ON

AIR INTAKE LANE rty sels .... 2 TO B
3 TO A E

With the AIR INTAKE LANE rotary selector for intake No.3 at the non-auto A position and intake No.2 at the non-auto B position, the A control lane of intake No.3 and the B control lane of intake No.2 are powered from the a.c. essential busbars.

contd.

IF NO.4 AC MAIN BUS LT ON

AIR INTAKE LANE rty sels .... 1 TO A
4 TO B E

With the AIR INTAKE LANE rotary selector for intake No.1 at the non-auto A position and intake No.4 at the non-auto B position, the A control lane of intake No. 1 and the B control lane of intake No.4 are powered from the a.c. essential busbars.

END//

IF AC MAIN BUS LT OFF, BTB MI INLINE

SSB sw .... CLOSE E

Set the SSB switch to CLOSE to automatically parallel generators, when voltage and frequency compatible observe SSB MI inline.

EMERG GEN NORM/ISOL sw .... ISOL THEN NORM E

Set the EMERG GEN NORM/ISOL switch to ISOL for five seconds to switch off the emergency generator then return switch to NORM, observe selected light off.

ENGINE FEED PUMPS .... AS REQUIRED E

Set the ENGINE FEED PUMPS switches to agree with pump condition.

END//

IF AC MAIN BUS LT OFF, GCB MI INLINE

EMERG GEN NORM/ISOL sw .... ISOL THEN NORM E

Set the EMERG GEN NORM/ISOL switch to ISOL for five seconds to switch off the emergency generator then return switch to NORM, observe selected light off.

contd.

ELECTRICAL

ENGINE FEED PUMPS .... AS REQUIRED E

Set the ENGINE FEED PUMPS switches to agree with pump condition.

END//

NOTE
The navigation lights are inoperative if No. 1 a.c. main busbar 1x is lost.
The anti-collision lights are inoperative if No. 4 a.c. main busbar 4x is lost.

CAUTION
WHEN GENERATOR SUPPLY HAS BEEN RECOVERED AFTER AN AC MAIN BUS FAILURE, THE BTB SHOULD NOT BE RESET.

CAUTION
WHEN BUSBAR SUPPLY HAS BEEN RECOVERED BY BTB SWITCH ACTION THE ASSOCIATED GENERATOR MUST NOT BE RESELECTED.

AC ESS BUS LIGHT ON

With No. 1 AC ESS BUS light on,
busbars 5x, 32x and 33x are lost.

With No. 2 AC ESS BUS light on,
busbars 6x, 12x and 14x are lost.

With No. 3 AC ESS BUS light on
busbars 7x, 13x and 15x are lost.

With No. 4 AC ESS BUS light on
busbar 8x is lost.

AC ESS BUS sw .... EMERG E

Set the associated AC ESS BUS, NORM EMERG switch to EMERG, observe the AC ESS BUS light off and the SELECTED light (blue) on.

IF No.3 ESS BUS SW AT EMERG

ADC 2 .... OFF P

ADC No.2 will be lost. To prevent the nuisance of spurious overspeed warnings ADC No.2 is switched off.

IF AC ESS BUS LT REMAINS ON

EMERG GEN .... MANUAL E

Set the EMERG GEN selector to MANUAL and verify the EMERG GEN, NORM/ISOL switch is at NORM thereby causing the emergency generator to run. Observe the AC ESS BUS light off and the SELECTED light (blue) on.

If No. 2 a.c. essential busbar 6x is supplied from the emergency generator, busbars 10x and 12x are shed.

If No. 3 a.c. essential busbar 7x is supplied from the emergency generator, busbars 11x and 13x are shed.

If busbar 11X is shed ADC No.2 is lost. This causes a spurious overspeed warning which can be cancelled by switching off ADC No.2.

END//

contd.

The following major services are NOT AVAILABLE with

No.2 AC ESS BUS switch at EMERG	No.3 AC ESS BUS switch at EMERG
No.1 - AFCS - Autothrottle - Electric Trim - Safety Flight Control - Radar Blue & green Hydraulic contents gauges Nosewheel steering No.2 Compass standby supply	No.2 - AFCS - Autothrottle - Electric Trim - Autostabs - Artificial Feel - Safety Flight Control - ADC, ADI & HSI - ILS, VOR, DME & ADF - Captains VOR/RMI - Co-pilots ADF/RMI - Radio Altimeter Yellow Hydraulic Contents gauge No.2 compass normal supply

NOTE

No.2 compass will only be inoperative if both No.2 and No.3 switches are at EMERG.

EMERG GEN FAIL LIGHT ON

FAIL LT .... PRESS AND RELEASE E

Pressing the FAIL light resets the excitation circuit if it has been de-excited, observe FAIL light off.

IF FAIL LT REMAINS ON
EMERG GEN .... CHECK VOLTS & FREQUENCY E

Set the AC FREQ/VOLTS rotary selector to EMERG PWR. The AC FREQUENCY and VOLTS meters should be observed on-scale.

It is possible for a small undervoltage or underfrequency to operate the FAIL light but for the generator to be giving an acceptable output.

The above actions have done all that is possible to regain the emergency generator. If the AC VOLTS and/or FREQUENCY meters read off-scale or zero it is now necessary to isolate the emergency generator to reduce possibility of electrical and/or hydraulic system damage.

IF OFF-SCALE OR ZERO
EMERG GEN NORM/ISOL sw .... ISOL E

Set the EMERG GEN, NORM ISOL switch to ISOL to stop the generator from running, observe the O/HEAT light goes off.

SYSTEMS POWERED BY THE
AFFECTED AC ESSENTIAL BUSBARS .... MONITOR E

Monitor systems powered by the affected a.c. essential busbars.

END//

FAILURE OF ONE OR TWO GENERATORS

GENERATOR .... TEST
CHECK VOLTS
& FREQUENCY E

Set the associated generator selector(s) to TEST and the AC FREQ/VOLTS selector to the GEN number of the affected channel(s), observe frequency and volts normal.

Systems data:

AC frequency	396 to 404 Hz
AC volts	110 to 118 volts

IF VOLTS AND FREQUENCY ARE ABNORMAL

GENERATOR .... OFF E

Set the associated generator selector to OFF.

Observe the associated GEN light (amber) is on, the associated GCB MI shows crossline, the KW KVAR meter reads 0 and the KW indications on the remaining generators are within limits.

IF KW INDICATIONS ON REMAINING GENERATORS ARE ABOVE LIMITS

ELECTRICAL LOADS .... REDUCE E

Reduce electrical loads until the KW indications are within limits.

END//

IF VOLTS AND FREQUENCY ARE NORMAL

GENERATOR .... ON E

Set the generator selector to ON to connect its output to its a.c. main busbar.

NOTE

If two main generators are off-line and WING & INTAKE ANTI-ICING is selected, monitor loads and shed galleys if necessary.

END//

DC ESS BUS LIGHT ON

BATTERY sel .... BATT ON E

Set the battery selector to BATT ON and observe indication on battery ammeter within limits.

IF BATTERY AMMETER OFF SCALE
BATTERY sel .... BATT OFF E

Set the battery selector to OFF and observe BATT ISOLATE light (amber) on.

TRU sws .... ALL NORM E

Verify TRU NORM ISOL switches (4) at NORM

DC VOLTS sel .... AFFECTED BUSBAR E

Rotate DC VOLTS selector to affected busbar and observe voltage acceptable.

IF ESS B VOLTAGE NOT ACCEPTABLE
EMERG GEN .... MANUAL E

Unguard and set the EMERG GEN selector to MANUAL and observe SELECTED light (blue) on.

When d.c. essential B busbar 4P fails
The a.c. essential busbars 7X and 8X transfer to the emergency generator which must be started manually.

The following are not available

Avionics "B" busbar 11X
26V a.c. main "B" busbar 13X
Flying controls "B" busbar 23X (Blue channel)
BTB 3 and 4 SSB
Automatic selection of the emrgency generator

END//

When d.c. essential A busbar 3P fails
The a.c. essential busbars 5X and 6X transfer to the emergency generator which starts automatically.

The following are not available

Avionics "A" busbar 10X
26V a.c main "A" busbar 22X (Green channel)
BTB 1 and 2 SSB
Manual selection of the emergency generator.

END//

DC MAIN BUS LIGHT ON

Observe the essential main split MIs(2) inline.

The d.c. main busbar is in two parts, 1P and 2P, connected by fuses and each part is protected by its own undervoltage unit.

IF ESSENTIAL MAIN SPLIT MI(s) NOT INLINE

BATTERY sels (2) .... BATT ON E

Verify battery selectors (2) at BATT ON

DC VOLTS sel .... MAIN A E

Rotate DC VOLTS selector to MAIN A and observe voltage normal.

IF VOLTMETER READING IS 0

No.2 TRU sw .... NORM E

Verify No.2 TRU switch is at NORM and observe No.2 TRU ammeter reads 0

REPEAT OPERATION FOR MAIN B (No.3 TRU) E

END//

CSD LIGHT ON

CSD .... DISC E

Unguard and set the CSD disconnect switch to DISC and release.

Reset of the CSD is only possible on the ground with the engine stopped.

GENERATOR .... OFF E

Set the associated generator selector to OFF.

Observe the associated GEN light (amber) is on, the associated GCB MI shows crossline, the KW KVAR meter reads 0 and the KW indications on the remaining generators are within limits.

IF KW INDICATIONS ON REMAINING GENERATORS ARE ABOVE LIMITS

ELECTRICAL LOADS .... REDUCE E

Reduce the electrical loads until the KW indications are within limits.

END//

CSD OIL INLET TEMPERATURE LIGHT ON

CSD OIL INLET TEMPERATURE .... MONITOR E

Monitor the CSD OIL INLET temperature. The response rate of oil temperature to corrective action is relatively slow, therefore early warning is given by the CSD OIL INLET temperature light to minimise the possibility of infringing CSD OIL INLET temperature limitation.

IF CSD OIL INLET TEMPERATURE EXCEEDS 155° C

ENGINE FUEL TEMPERATURE
(SECONDARY INSTRUMENTS PANEL) .... OBSERVE E

Observe on the power plant secondary instruments panel the engine fuel temperature.

IF ENGINE FUEL TEMPERATURE ABOVE 70° C

FUEL HEATER .... OFF E

Set associated FUEL HEATER selector to OFF.

ELECTRICAL LOAD .... REDUCE IF PRACTICABLE E

IF CSD OIL INLET TEMPERATURE REMAINS ABOVE 155° C FOR 5 MINS

CSD .... DISC E

Unguard and set the CSD disconnect switch to DISC and release.

Reset of the CSD is only possible on the ground with the engine stopped

GENERATOR .... OFF E

Set the associated generator selector to OFF.

Observe the associated GEN light (amber) is on, the associated GCB MI shows crossline, the KW KVAR meter reads 0 and the KW indications on the remaining generators are within limits.

END//

CSD HIGH DIFFERENTIAL TEMPERATURE

IF THE CSD OIL DIFF TEMPERATURE EXCEEDS:-
20°C FOR ELECTRICAL LOADS UP TO 30 KW
OR
30°C FOR ELECTRICAL LOADS ABOVE 30 KW

GENERATOR .... OFF E

Set the associated generator selector to OFF.

Observe the associated GEN light (amber) is on, the associated GCB MI shows crossline, the KW KVAR meter reads 0 and the KW indications on the remaining generators are within limits.

Observe CSD OIL DIFF TEMPERATURE

IF CSD OIL DIFF TEMPERATURE REMAINS ABOVE 20° C
CSD .... DISC E

If with the generator switched OFF the CSD OIL DIFF temperature remains above 20° C.

Unguard and set the CSD disconnect switch to DISC and release.

Reset of the CSD is only possible on the ground with the engine stopped.

END//

BATT ISOLATE LIGHT ON

BATTERY sel ....BATT ON OR
ESS/MAIN SPLIT E

Verify the battery selector is at BATT ON or ESS/MAIN SPLIT.
The BATT ISOLATE light should be observed off and the battery MI inline.

IF BATT ISOLATE LT ON

BATTERY sel ....BATT OFF E

Set the battery selector to BATT OFF to disconnect the battery from associated d.c. busbar.

END//

TRU OVERHEAT LIGHT ON

TRU sw ....ISOL E

Set TRU NORM/ISOL switch to ISOL. Observe the TRU ammeter indicating zero and after a delay the O/HEAT light off.

The TRU will cool when the a.c. supply to it is broken.

The O/HEAT light will go off when the TRU temperature drops.

END//

GENERATOR FAILS TO PARALLEL

Parallel assist is required when a generator does not accept automatic paralleling with other generators already online indicated by associated GEN light being on and associated GCB MI showing crossline.

A.C. FREQ .... COMPARE E

Set the AC FREQ/VOLTS rotary selector to the off-line generator then to another generator online to compare their frequencies.

NOTE
With the a.c. main busbars paralleled the frequency of any generator connected to the busbars will be the busbar frequency.

P/ASSIST pb(s) ....PRESS E

If the offline generator frequency is lower than the busbar frequency press the P/ASSIST push button of the offline generator.
If the offline generator frequency is higher than the busbar frequency press the P/ASSIST push button of the online generators.

GEN LT/GCB MI .... OBSERVE E

Observe the GEN light and GCB MI of the offline generator.

IF GEN LT ON AND/OR GCB MI SHOWS CROSSLINE

IN FLIGHT

GENERATOR .... OFF E

Set associated generator selector to OFF and ensure remaining generators are within limits.

END//

ON GROUND

BTB sel .... TRIP E

Set the BTB selector of the offline generator to TRIP and release.

BTB TRIP is required when the PARALLEL ASSIST procedure does not succeed in paralleling a generator with other generators online.

ELECTRICAL

AC MAIN BUS lt .... OBSERVE E

Observe the AC MAIN BUS light associated with tripped BTB.

IF AC MAIN BUS LT ON
GENERATOR .... OFF E

Set the associated generator selector to OFF and ensure remaining generators are within limits.

BTB sel .... RESET AND RELEASE E

Set the BTB selector to RESET and release

END//

IF AC MAIN BUS LT OFF
APPLY PROCEDURE : MANUAL PARALLEL

MANUAL PARALLEL

CAUTION
MANUAL PARALLELING MUST NOT BE ATTEMPTED IF THERE IS A DIFFERENCE OF MORE THAN 6 Hz ACROSS THE BTB.

PARALLEL PUSH TO ARM pb ....PRESS TO ARM OBSERVE LT CYCLES DIM AND BRIGHT E

Selective pressing of the parallel assist push button may slow the rate of the light cycle.

Should there be difficulty in reducing the rate of cycle of the parallel push button light the SSB may be selected open before manual paralleling is attempted. The SSB closes on the auto parallel circuit when reselected after the BTB s have been reset.

WHEN PARALLEL PUSH TO ARM PUSH BUTTON LIGHT IS DIM

BTB sel .... RESET AND RELEASE E

Set the BTB selector to RESET and release

GEN LT, GCB MI and BTB MI .... OBSERVE E

IF GEN LIGHT REMAINS OFF, GCB MI REMAINS INLINE, BTB MI SHOWS INLINE OR CROSSLINE

PARALLEL PUSH TO ARM pb .... PRESS TO DISARM E

END//

IF GEN LIGHT IS ON, GCB MI SHOWS CROSSLINE BTB MI SHOWS INLINE

PARALLEL PUSH TO ARM pb .... PRESS TO DISARM E

GENERATOR .... OFF E

Set the associated generator selector to OFF and ensure remaining generators are within limits.

END//

LANDING GEAR STANDBY LOWERING

L/GEAR NORMAL LEVER .... NEUTRAL P

With the normal landing gear lever at NEUTRAL the landing gear door selector valves go to their neutral position, thus removing green hydraulic pressure from the gear and door jacks.

YELLOW HYD PUMPS .... ON E

Set the yellow hydraulic pump selectors to ON because the yellow hydraulics system supplies for gear standby lowering and yellow pumps are not automatically switched on by gear standby lowering selections.

STANDBY LOWERING LEVER .... DOORS FOR 4 SECS THEN WHEELS E

Lift the guard, depress handle catch and set the standby lowering lever to DOORS. Wait four seconds to enable doors to be fully open (thereby preventing door/gear fouling), then, pressing the handle catch and release catch, set lever to WHEELS.
Gear should then lower, successful lowering being shown by normal gear down indication. It should be noted that the gear doors will remain open indicated by the transit lights (red) remaining on.

L/GEAR NORMAL LEVER .... DOWN P

Set the normal landing gear lever to DOWN making it and gear position agree.

ENGINES .... SHUT DOWN NO 4 LAST E

Shut down No. 4 engine last to ensure yellow hydraulic pressure is maintained in standby lowering system until the ground locks are fitted.

NOTE
The landing gear doors remain open,avoid large side slip angles.
Large side slip angles will put excessive side loads on the open gear doors.

END//

MAIN GEAR FREE FALL

L/GEAR NORMAL LEVER .... NEUTRAL P

With the normal landing gear lever at NEUTRAL the landing gear door selector valves go to their neutral position, thus removing green hydraulic pressure from the gear and door jacks.

STANDBY LOWERING LEVER .... NEUTRAL E

With the standby lowering lever at NEUTRAL the landing gear standby selector valve goes to the neutral position, thus removing yellow hydraulic pressure from the landing gear and door jacks.

AT EMERGENCY CONTROL POSITION

Remove the detachable panel in the rear cabin, immediately above the main gear bay in the cabin floor to gain access to the free fall release mechanism. The Instruction label is under access panel.

contd.

EMERGENCY RELEASE OPERATION

1. MOVE OPEN INDEX ON KNURLED KNOB TO RED LINE.

Turn the knurled knob counter clockwise until the open index on the knurled knob aligns with red line, using the control lever if necessary to turn knob.

Operation of the knurled knob causes an auto-depressurization valve in the main landing gear hydraulic system to open thus confirming cut off of the green hydraulic pressure to the main landing gears. It also vents the return side of the main landing gear and door jacks to atmosphere thereby losing a small amount of green hydraulic fluid.

2. REMOVE PIN FROM BELLCRANK.

Insert the control lever in the top of the bellcrank facing forward and use the lever to relieve any pressure on the pip pin. Move the control lever to the right.

3. OPERATE BELLCRANK TO RIGHT HAND BY USE OF CONTROL LEVER.

The control lever when engaged with the bellcrank and moved to the right, through mechanical linkage releases the main landing gear and door uplocks. The main landing gear and doors free fall under their own weight and aerodynamic loads.

4. CHECK DOWNLOCK VISUAL INDICATION.

UNLOCKED	LOCKED
○ RED	○ RED
	▭ WHITE

Press the optical viewer push button and observe indication through the eyepiece.

The light (red) on indicates that the viewer is serviceable and the bright line (white) indicates the gear is locked down.

(Unchanged)

5. IF DOWNLOCK IS NOT OBTAINED USE PNEUMATIC AID (LOCATED BETWEEN TWO CENTRE CROSSBEAMS).

If gear is not locked down remove cover from pneumatic line and attach to LH or/and RH pneumatic connector as appropriate, open cock to allow air into the telescopic side strut to lock leg down, when locked indication obtained close cock and remove air line from pneumatic connector.

Remove and stow control lever, replace panel.

contd.

⇩

L/GEAR NORMAL LEVER ....DOWN P

Move the guard to the left and set the normal landing gear lever to DOWN to make it and gear position agree.

END//

NOTE

The landing gear doors remain open.
Avoid large side slip angles.
If the green hydraulic system is not pressurised the tail wheel will not lower.

The above procedure takes approx. 3½ minutes.

NOSE GEAR FREE FALL

L/GEAR NORMAL LEVER .... NEUTRAL P

With the normal landing gear lever at NEUTRAL the landing gear door selector valves go to their neutral position, thus removing green hydraulic pressure from the gear and door jacks.

STANDBY LOWERING LEVER .... NEUTRAL E

With the standby landing gear lever at NEUTRAL the landing gear standby selector valve goes to the neutral position, thus removing yellow hydraulic pressure from the landing gear and door jacks.

AT EMERGENCY CONTROL POSITION

Remove the detachable panel in the forward cabin immediately above the nose gear bay in the cabin floor to gain access to the free fall mechanism. The instruction label is next to the free fall controls.

contd.

EMERGENCY RELEASE OPERATION

1. PULL OUT PIN.

Remove the safety pin from the square drive to enable it to be moved.

2. LOCATE HAND WHEEL.

Fit the hand wheel on the square drive.

3. TURN HAND WHEEL FULLY CLOCKWISE

The hand wheel should be turned fully clockwise approximately six turns.

Operation of the hand wheel causes a decompression valve in the nose landing gear hydraulic system to direct pressure to the pressure and return valve isolating the normal hydraulic selectors from the green hydraulic system and connecting them to yellow return. It also opens the vent valves which allows the door and gear down lines to vent to atmosphere thereby losing a small amount of fluid and releases the door and gear uplocks allowing the gear to free fall.

4. CHECK DOWN LOCK VISUAL INDICATION

Remove the detachable panel in the forward cabin behind the free fall mechanism panel to gain access to the optical viewer.

UNLOCKED	LOCKED
○ RED	○ RED
	▭ WHITE

Press the optical viewer push button and observe indication through the eyepiece.

The light (red) on indicates that the viewer is serviceable and the bright line (white) indicates the gear is locked down.

L/GEAR NORMAL LEVER .... DOWN P

Set the normal landing gear lever to DOWN to make it and gear position agree.

END//

NOTE

The landing gear doors remain open, avoid large side slip angles.

(Unchanged)

WHEELS O/HEAT LIGHT ON IN FLIGHT

WITH LANDING GEAR UP

If shortly after take-off the WHEELS O/HEAT light comes on with landing gear up.

VISOR .... DOWN P

Verify that the visor is down since with the visor up landing gear normal lowering is inhibited.

LANDING GEAR .... DOWN P

Move the guard to the left and set the L/GEAR NORMAL LEVER to DOWN. The ENGINE RATING MODE sws will return to TAKE-OFF when the gear is lowered.

BRAKE FANS .... CONFIRM ON E

To assist in cooling the brakes, the BRAKE FANS sw should be set to ON.

WHEN BRAKES TEMP LESS THAN 150°C

LANDING GEAR .... UP: LTS OFF: NEUTRAL PE

Set the L/GEAR NORMAL LEVER to UP.

Observe landing gear position indication lights go off at the end of the retraction sequence.

Set L/GEAR lever to NEUTRAL.
Observe landing gear position indication lights off.

BRAKE FANS .... OFF E

Verify BRAKE FANS sw at OFF.

ENG RATING MODE .... FLIGHT E

Set the ENGINE RATING MODE sws to FLIGHT

END//

Contd

Deletio

●▶WITH LANDING GEAR DOWN

PROVIDING SAFETY CONSIDERATIONS PERMIT LEAVE LANDING GEAR DOWN UNTIL BRAKES TEMP LESS THAN 150°C.

BRAKE FANS .... CONFIRM ON E

Verify BRAKE FANS switch is at ON during cooling of brakes.

END//

NOTE

If temperature 700 deg C for 5 minutes with gear down the warning can be considered false and gear may be retracted.

(Unchanged)

USE OF BRAKES IN EMERG

The BRAKES FAIL light will come on to indicate a low hydraulic pressure condition in the normal brakes system.

THIS DRILL IS USED IF THE BRAKES FAIL LIGHT IS ON OR IF FOUR OR MORE R LIGHTS ARE OFF IN THE LANDING CHECKS.

BRAKE PEDALS .... RELEASE C

Release pressure from brake pedals before moving the brakes lever to EMERG to prevent possibility of brake overtorque.

BRAKES LEVER ....EMERG C

Pull BRAKES lever to EMERG, observe the BRAKES FAIL light off, BRAKES EMERG light (amber) on.

With the BRAKES lever at EMERG the brakes are hydraulically powered from the yellow system. Operation of the pilots pedals gives progressive and differential braking.

ANTI-SKID IS NOT AVAILABLE. USE THE BRAKES WITH CARE, APPLYING PRESSURE GENTLY AND MONITORING THE PRESSURE WITH REFERENCE TO THE BRAKES PRESSURE GAUGE.

ON A WET RUNWAY THE BRAKES MUST BE RELEASED EVERY 5 SECONDS AND THE FOLLOWING MAXIMUM PRESSURES MUST NOT BE EXCEEDED:

450 PSI AT SPEEDS ABOVE 75 KNOTS AND
900 PSI AT SPEEDS BELOW 75 KNOTS.

ON A DRY RUNWAY CONTINUOUS BRAKING TO A MAXIMUM OF 1100 PSI IS PERMITTED.

If use of the emergency braking system follows a loss in the yellow hydraulic system, only 15 brake applications are available from the brake accumulator.

APPLY BRAKES AS REQUIRED

⇩

IF AIRCRAFT IS NOT BRAKED

BRAKES LEVER ....PARK P

Pull BRAKES lever to PARK.

CAUTION
PARK SHOULD ONLY BE USED WHEN ABSOLUTELY NECESSARY. NO MODULATION OF THE BRAKE PRESSURE IS AVAILABLE, BECAUSE AT PARK POSITION ALL AVAILABLE BRAKE ACCUMULATOR PRESSURE IS DELIVERED TO THE BRAKES.

END//

(Unchanged)

L/G ABNORMAL IND AFTER UP SELECT

The landing gear configuration is abnormal approximately 30 seconds after selection.

DO NOT EXCEED 250 KNOTS, AVOID EXCESS "G" C

LANDING GEAR - FAULT ANNUNCIATOR .... NOTE E

Observe and note state of landing gear indicator and landing gear fault annunciator.

VISOR ....VERIFY DOWN P

Verify the visor is down since with the visor up landing gear normal lowering is inhibited.

LANDING GEAR .... DOWN P

Move the guard to the left and set the L/GEAR NORMAL LEVER to DOWN.
Observe LH, NOSE, T and RH arrow lights (green) on and LH SHORT, RH SHORT, UPPER LOCKS and transit lights off at end of the lowering sequence.

IF THE LANDING GEAR DOWN CONFIGURATION IS NOT CORRECT AFTER APPROXIMATELY 30 SECONDS

APPLY PROCEDURE : LANDING GEAR STANDBY LOWERING

IF THE LANDING GEAR DOWN CONFIGURATION IS CORRECT

LANDING GEAR .... UP P

Set the L/GEAR NORMAL LEVER to up.
Observe the landing gear position indication lights go off at the end of the retraction sequence.

IF THE LANDING GEAR CONFIGURATION IS NOT CORRECT

LANDING GEAR - FAULT ANNUNCIATOR ....NOTE E

Observe and note state of landing gear indicator and landing gear fault annunciator.

LANDING GEAR .... DOWN P

END//

UPPER LOCKS LIGHT ON IN FLIGHT

CAUTION

1. AFTER LOWERING THE LANDING GEAR IT MUST NOT SUBSEQUENTLY BE RETRACTED.

2. THE LANDING GEAR MUST NOT BE SELECTED UP WITH THE UPPER LOCKS LIGHT ON.

AVOID EXCESS "G" CONDITIONS

END//

LOSS OF NOSEWHEEL STEERING

AT HIGH SPEED
STEER THE AIRCRAFT USING THE RUDDER PEDALS C

AT LOW SPEED
STEER THE AIRCRAFT USING DIFFERENTIAL BRAKING C

WHEN THE AIRCRAFT SPEED IS APPROXIMATELY 5 KT

NOSEWHEEL STEERING .... RESET P

Press the nosewheel steering push button, this will regain nosewheel steering if the failure was a transient one.

CAUTION
IF, WHEN THE RESET IS ATTEMPTED, THERE IS A STANDING SIGNAL FROM EITHER THE NOSEWHEEL STEERING HANDLES OF THE RUDDER PEDALS, THE AIRCRAFT MAY TURN IN RESPONSE TO THE SIGNAL. IT IS THEREFORE ONLY SAFE TO USE THE RESET AT VERY LOW SPEEDS.

IF THE NOSEWHEEL LIGHT ON

CONTINUE WITH DIFFERENTIAL BRAKING FOR STEERING C

END//

HIGH ENERGY STOP

Following a high energy stop, energy absorption should be assessed by reference to brake temperature indication or by use of the brake kinetic energy graph. The kinetic energy graph is published in section 5 of the Cruise Control Manual and need only be used in the event of a brake temperature indication being unserviceable.

1. If the displayed (highest) brake temperature peaks at less than 700°C OR Kinetic Energy is less than 42.5 million Joules:-

   (a) the aircraft may return to the ramp.

   (b) record the PEAK brake temperatures.

   (c) a visual inspection of tyres and water deflectors (including the nose position) must be carried out.

2. If any brake temperature is 700°C or greater OR Kinetic Energy is 42.5 million Joules or greater:-

   (a) the aircraft must park clear of populated ramp areas.

   (b) brake, wheel and tyre checks must be carried out as per Maintenance Manual 5-33-12.

   (c) record each brake position that exceeds 700°C.

(Unchanged)

BRAKES OVERLOAD MI SHOWS WHITE (CLOVERLEAF)

ANTI-SKID R lts .... MONITOR P.E

Carefully monitor the ANTI-SKID R lts at speeds above 10 kt whilst taxiing and during the take-off roll.

IF AT 10KT ANTI-SKID R lt(s) on

TAKE-OFF .... ABANDON ALL

Abandon the take-off

END//

VISOR/NOSE UNLOCK LIGHT ON

●▶ WITH THE VISOR/NOSE UP

SPEED .... REDUCE TO LESSER OF 325 KT M = 0.95 C

Reduce speed using normal procedure to observe limitation with Visor/Nose up but unlocked, replan flight.

END//

●▶ WITH NOSE AT 5° OR DOWN AND NOSE MI READING UP

BEFORE LANDING

G.P.W. C/B .... TRIP E

Trip the Ground Proximity warning system circuit breaker to prevent nuisance warning on landing, when nose MI reads UP and the nose is down.

CIRCUIT BREAKER	PANEL	GRID REF
GRND PROXIMITY WARN AC SUP	13-215	G4

AT LANDING

CG .... 52.5% E

Adjust the landing C.G. to 52.5% to compensate for the loss of artificial stability aids.

MINIMUM SPEED .... V_{REF} PLUS 10 KT C

Increase the V reference speed by 10 knots to take account of the loss of all high incidence protection systems.

NOTE

With the nose not in the up position the cause of the MI reading UP may be mechanical failure of the nose position transmitter. In this case both ADC incidence output signals used for indication and high incidence protection will be in error as follows:

Nose at 5° - Indicated incidence approximately 4° low.

Nose down - Indicated incidence approximately 11° low.

Continued

NOTE

In addition the weather radar datum will be along the droop nose axis. The datum can be corrected by setting the equivalent angle of the droop nose on the radar tilt selector (UP).

END//

● ▶ IF 5° LT ON

APPLY PROCEDURE NOSE 5°L LIGHT ON.

NOSE 5°L LIGHT ON

Observe caution before lowering the nose.

CAUTION
WITH UNSAFE 5° LOCKS THE NOSE MAY, DURING THE LOWERING SEQUENCE, PASS THE 5° POSITION TOWARD THE DOWN POSITION. THEREFORE BEFORE SELECTING 5° REDUCE SPEED TO 270 KTS AND ALTITUDE BELOW 20000 FT.

●▶ WITH NOSE UP

CONTINUE WITH NORMAL FLIGHT.

Normal flight is permitted if the nose is to remain up, since the nose is positively held up by uplocks.

Observe the caution before lowering the nose.

END//

●▶ WITH THE NOSE AT 5°

NOSE .... SELECT UP P

Select the nose to up to engage the uplocks thereby preventing inadvertent movement of the nose to down.

Observe the caution before lowering the nose.

END//

VISOR/NOSE STANDBY LOWERING (VISOR UP TO NOSE 5°)

● ▶ IF GREEN TANK LEVEL HAS FALLEN SINCE FIRST ATTEMPT TO LOWER VISOR

APPLY PROCEDURE VISOR NOSE FREE FALL

If it appears that green hydraulic system fluid has been lost during or after the attempt to lower the visor do not use the STBY control as this may lead to loss of the yellow hydraulic system fluid.

END//

● ▶ IF GREEN TANK LEVEL HAS NOT FALLEN SINCE FIRST ATTEMPT TO LOWER VISOR

STBY CONTROL sw .... VISOR LOWER P

Lift guard and set NOSE/VISOR, STBY control switch to VISOR LOWER and observe the visor moves downwards, unlock light on then off, VISOR MI reads DOWN.

Setting the STBY control switch to VISOR LOWER onloads the yellow hydraulic system and selects it to release the visor uplock and drive the visor down.

When the standby system is used to lower the visor it must also be used to lower the nose.

If the visor will not lower and the yellow hydraulic system shows no signs of abnormality, the two most likely causes are, the visor hydraulic uplock may be inoperative or the visor may be frozen to the fuselage. Attempt to lower visor by lowering nose to 5°.

▶ IF 5°L LT ON

SPEED .... REDUCE TO 270 KTS C

ALTITUDE .... BELOW 20,000 FT C

Observe caution when lowering the nose.

CAUTION

WITH UNSAFE 5° LOCKS THE NOSE MAY DURING THE LOWERING SEQUENCE PASS THE 5° POSITION, THEREFORE BEFORE LOWERING THE NOSE TO 5° REDUCE SPEED TO 270 KTS AND ALTITUDE BELOW 20,000 FT.

STBY CONTROL sw .... NOSE 5° P

Set the STBY control switch to NOSE 5° and observe the

contd.

NOSE AND VISOR

nose moves downwards, unlock light on then off, NOSE MI reads 5° and the 5°L light remains off.

Setting the STBY control switch to NOSE 5° selects the yellow hydraulic system to release the nose uplocks thus allowing the nose to fall to the 5° position under its own weight and aerodynamic loads.

If prior to selection of NOSE 5° the visor was at up the following sequence occurs:-
as the nose falls to 5° the visor moves with it.
A mechanical linkage trips the visor uplock and the visor is driven down, relative to the nose, by the yellow hydraulic system.

IF NOSE WILL NOT LOWER TO 5°
APPLY PROCEDURE: VISOR/NOSE FREE FALL

IF NOSE LOWERS TO 5°

WHEN REQUIRED

APPLY PROCEDURE: NOSE STANDBY LOWERING (5° to DOWN)

END//

NOSE AND VISOR

NOSE STANDBY LOWERING (5° TO DOWN)

● ▶ IF GREEN TANK LEVEL HAS FALLEN SINCE FIRST ATTEMPT TO LOWER VISOR

PREPARE TO LAND WITH NOSE AT 5° AND EXISTING VISOR POSITION C

GPW C/B .... TRIP E

The ground proximity warning system may be inhibited in order to prevent nuisance warnings when nose at 5° or higher by tripping the following circuit breaker.

GRND PROXIMITY WARNING AC SUP	13-215	G4

tripping this circuit breaker will inhibit all modes of operation of the ground proximity warning system.

END//

● ▶ IF GREEN TANK LEVEL HAS NOT FALLEN SINCE FIRST ATTEMPT TO LOWER VISOR

STBY CONTROL sw .... NOSE DOWN P

Set the STBY control switch to NOSE DOWN and observe 5°L light on then off, unlock light on then off, down light (green arrow) on, NOSE MI reads DOWN.

The STBY control switches must be at VISOR DOWN and NOSE 5° to position the sequence plate before the STBY control switch can be moved to NOSE DOWN.

IF NOSE WILL NOT LOWER TO DOWN

PREPARE TO LAND AS PRESENTLY CONFIGURED C

GPW C/B .... TRIP E

The ground proximity warning system may be inhibited in order to prevent nuisance warning with nose at 5° or higher by tripping the following circuit breaker.

GRND PROXIMITY WARNING AC SUP	13-215	G4

END//

VISOR/NOSE FREE FALL

GPW C/B .... TRIP E

The ground proximity warning system may be inhibited in order to prevent nuisance warning with the nose at 5° or higher by tripping following circuit breaker.

CIRCUIT BREAKER	PANEL	GRID REF
GROUND PROXIMITY WARNING AC SUP	13-215	G4

Tripping this circuit breaker will inhibit all modes of operation of the ground proximity warning system.

▶ IF 5°L LIGHT ON
SPEED .... REDUCE TO 270 KT C
ALTITUDE .... BELOW 20,000 FT C

CAUTION
WITH UNSAFE 5° LOCKS THE NOSE MAY DURING THE LOWERING SEQUENCE, PASS THE 5 ° POSITION TOWARD THE DOWN POSITION, THEREFORE BEFORE SELECTING 5° REDUCE SPEED TO 270 KTS AND ALTITUDE BELOW 20000 FT.

EMERGENCY NOSE/VISOR
UPLOCK RELEASE .... OPERATE FULLY
TO ENGAGE LATCH E

Release the pip pin from the EMERGENCY NOSE/VISOR UPLOCK RELEASE and pull the handle outwards and upwards to fully engage the latch, observing the visor and/or nose lowers.

If prior to the handle being pulled upwards the visor was at up the following sequence occurs:

As the nose falls to 5° the visor moves with it, a mechanical linkage trips the visor uplock and the visor falls relative to the nose.

PREPARE TO LAND AS PRESENTLY CONFIGURED C

END//

VISOR FAILS TO RISE

Verify VISOR/NOSE lever UP

WINDSHIELD WIPERS .... PARKED P

Verify both windshield wipers are correctly parked below the red marks on the inside surface of the forward screen adjacent to the centre pillar using wiper EMERG PARK facility if necessary.

IF VISOR FAILS TO RISE WITH BOTH WIPERS CORRECTLY PARKED

WIPER O/RIDE sw .... WIPER O/RIDE P

Set WIPER O/RIDE switch to WIPER O/RIDE to bypass the visor raise inhibition.

IF VISOR FAILS TO RISE

WIPER O/RIDE sw .... NORMAL P

Set WIPER O/RIDE switch to NORMAL.

Replan flight with visor down

END//

IF VISOR RISES

WIPER O/RIDE sw .... NORMAL P

Set WIPER O/RIDE switch to NORMAL

END//

SHUT DOWN OF AIR CONDITIONING GROUPS

BLEED VALVES .... SHUT E

Set the associated BLEED VALVES switch to SHUT to prevent any hot air flow through the relief valve into the engine nacelle and observe the associated BLEED VALVES MI shows crossline.

COND VALVE .... OFF E

Set the associated COND VALVE selector to OFF and observe the conditioning valve MI crossline.

ASSOCIATED GROUP sw .... FAILED E

Set the associated temperature control changeover switch to FAILED to enable all areas of cabin to be temperature controlled and observe group 1,2,3 MIs showing supplies maintained.

COND VALVES FOR OTHER GROUPS .... BOOST E

Set the COND VALVE selectors for the other groups to BOOST to raise regulation value of mass flow.

AFTER SHUT DOWN OF A SECOND GROUP

(Deletion)

DISCHARGE VALVE sw FOR
SYSTEM IN USE .... AFT SHUT E

Set DISCHARGE VALVE switch for system in use to AFT SHUT thereby ensuring forward rack cooling by directing outflow from aircraft via the forward discharge valve.

FWD EMERGY RELIEF sw .... OPEN E

Set the FWD EMERGY RELIEF switch to OPEN to enable rack cooling flow to be discharged.

FWD EXTRACT FANS .... ALL ON E

Set the FWD EXTRACT FANS to ALL ON in an attempt to restore the forward rack cooling.

The fan air by-passes the forward mass flow sensor via the emergency relief valve.

contd.

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AIR CONDITIONING

SPEED .... OBSERVE MAX TAT 100°C   C

Adjust aircraft speed as required to limit the total temperature to 100°C

END//

AFTER SHUT DOWN OF A THIRD GROUP

TEMPERATURE SELECTOR .... COOLEST AUTO SETTING   E

For the remaining group, set the TEMPERATURE SELECTOR to O COOL AUTO

SPEED .... SUBSONIC   C

Aircraft speed is not to exceed M = 1.0

END//

NOTE
If STANDBY temperature control system is used, COLD or negative settings may only be used at altitude greater than 30,000 ft.

ED IN ENGLAND

BOTH FWD EXTRACT FLOW LIGHTS ON

This may or may not be accompanied by abnormal flow readings.

●▶ **WITH THE CONTROLLING FWD DISCHARGE VALVE SHUT**
DISCHARGE VALVES sws .... NORM E

Verify the DISCHARGE VALVES SYS 1 and SYS 2 switches are set to NORM to ensure that the forward DISCHARGE VALVE in use is not shut.

If the DISCHARGE VALVE for the controlling system is SHUT it will prevent forward rack cooling flow when the forward extract fans are not operating.

SYSTEM SELECT sws ....OTHER SYSTEM E

Set the SYSTEM SELECT switches to the other selection in an attempt to restore forward rack cooling flow, observe forward discharge valve regulates outflow.

IF FWD DISCHARGE VALVES REMAIN SHUT
AND FWD FLOW LTS ON
FWD EMERGY RELIEF sw .... OPEN E

Set the FWD EMERGY RELIEF switch to OPEN to enable rack cooling flow to be discharged.

FWD EXTRACT FANS .... ALL ON E

Set the FWD EXTRACT FANS to ALL ON in an attempt to restore the rack cooling.

The fan air by-passes the forward mass flow sensor via the emergency relief valve.

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(Deletion)

IF FWD FLOW LTS STILL REMAIN ON

CABIN & FLIGHT DECK
TEMPERATURE SELECTORS ....COOLEST AUTO SETTING E

Set the FWD CABIN and FLIGHT DECK TEMPERATURE SELECTORS to O COOL AUTO

AIR INTAKES, INS &
WEATHER RADAR .... MONITOR E

Equipment should be monitored for effects of overheating leading to false indication or malfunction

Shut down affected equipment as soon as possible after landing to reduce probability of failures due to overheating.

DME may become unreliable.
ARINC internally cooled boxes in the forward racking are to be removed for check after landing.

Cabin differential pressure of 1 psi or more is normally adequate to maintain normal forward extract flow with fans off.

END//

CAUTION
IF AIR INTAKE FAILURE OCCURS REDUCE SPEED TO SUBSONIC AND APPLY APPROPRIATE PROCEDURES.

●▶ WITH THE CONTROLLING FWD DISCHARGE VALVE REGULATING NORMALLY

FWD EMERGY RELIEF sw ....SHUT E

Verify FWD EMERGY RELIEF switch at SHUT since rack flow is lost if this valve is open with fans off.

(Deletion)

IF FWD FLOW LTS REMAIN ON
FWD EMERGY RELIEF sw .... OPEN E

Set the FWD EMERGY RELIEF switch to OPEN to enable rack cooling flow to be discharged.

FWD EXTRACT FANS .... ALL ON E

Set the FWD EXTRACT FANS to ALL ON in an attempt to restore the forward rack cooling.

The fan air by-passes the forward mass flow sensor via the emergency relief valve.

IF FWD FLOW LTS STILL REMAIN ON
CABIN & FLIGHT DECK
TEMPERATURE SELECTORS ....COOLEST AUTO SETTING E

Set the CABIN and FLIGHT DECK TEMPERATURE SELECTORS to 0 COOL AUTO

AIR INTAKES, INS &
WEATHER RADAR ....MONITOR E

Equipment should be monitored for effects of overheating leading to false indication or malfunction.

DME may become unreliable
ARINC internally cooled boxes in the forward racking are to be removed for check after landing

Cabin differential pressure of 1 psi or more is normally adequate to maintain normal forward extract flow with fans off.

END//

CAUTION
IF AIR INTAKE FAILURE OCCURS REDUCE SPEED TO SUBSONIC AND APPLY APPROPRIATE PROCEDURES

(Deletion)

RH OR LH FWD EXTRACT FLOW LIGHT ON

This may or may not be accompanied by abnormal flow readings

If the total forward extract flow is reduced to approximately half the normal value, for any reason, operation of left hand or right hand FWD EXTRACT FLOW lights may occur individually, due to tolerance on pressure switch settings and duct pressures.

CABIN & FLIGHT DECK TEMPERATURE SELECTORS ....COOLEST AUTO SETTING E

Set the CABIN and FLIGHT DECK TEMPERATURE SELECTORS to O COOL AUTO

AIR INTAKES, INS & WEATHER RADAR ....MONITOR E

Equipment should be monitored for effects of overheating leading to false indication or malfunction.

In the event of loss of cooling to left hand racks, DME may become unreliable.

ARINC internally cooled boxes in the affected racking are to be removed for check after landing

Cabin differential pressure of 1 psi or more is normally adequate to maintain normal forward extract flow with fans off.

CAUTION

IF AIR INTAKE FAILURE OCCURS, REDUCE SPEED TO SUBSONIC AND APPLY APPROPRIATE PROCEDURES.

END//

(Unchanged)

REAR EXTRACT FLOW LIGHT ON

REAR EXTRACT STANDBY FAN ....ON E

Set the REAR EXTRACT STANDBY switch to on in an attempt to re-instate rear rack cooling flow.

IF FLOW LT REMAINS ON
SPEED ....SUBSONIC C

Reduce speed using normal descent technique to subsonic. This is a precautionary measure to cover possible failure of the engine intake control system.

HF & ADF .... MINIMUM USE C

Keep operation of HF and ADF to a minimum to reduce heat output.

REAR CABIN
TEMPERATURE SELECTORS ....COOLEST AUTO SETTING E

Set the REAR CABIN TEMPERATURE SELECTORS to O COOL AUTO.

IMMEDIATELY THE AIRCRAFT SPEED FALLS BELOW M = 1.30

RAMP/SPILL MASTER sws .... ALL MAN E

Set the RAMP/SPILL MASTER switches (4) to MAN to reduce heat output from rear racks.

AICU C/Bs .... TRIP E

The AICU circuit breakers should be tripped without delay once the aircraft speed falls below M = 1.30 in order to prevent overheating of AICU control boxes and to reduce heat load in rack enclosures.

CIRCUIT BREAKER	PANEL	GRID REF
AICU 1B SUP	14-216	A 5
AICU 4A SUP	14-216	B 5
AICU 2A SUP	13-216	A 3
AICU 3B SUP	13-216	B 3
AICU 4B SUP	2-213	B14
AICU 1A SUP	2-213	D14
AICU 3A SUP	2-213	H13
AICU 2B SUP	2-213	H14

ARINC internally cooled boxes in the rear racking are to

AIR CONDITIONING

be removed for check after landing.
If time permits, rack closure panels may be removed to allow additional cooling.

END//

CABIN EXCESS PRESSURE

CABIN DIFF PRESSURE ....CONFIRM WARNING E

Observe the cabin differential pressure above 11 psi.

CABIN ALT sel .... CONFIRM SETTING. IF NECESSARY SWITCH TO OTHER SYSTEM E

Verify cabin altitude selector setting is compatible with aircraft altitude.

If necessary set the SYS SELECT switch to the other system, and observe that cabin differential pressure decreases and the O/PRESS light is off.

The cabin differential pressure is limited to 10.7 psi by the amplifier of the selector system and to 11.2 psi by the cabin pressure limiter of each discharge valve.

END//

NAC/WING O/HEAT LIGHT ON

BLEED VALVE ....SHUT E

Set the associated BLEED VALVES switch to SHUT, since a leak from the engine bleed system may be the cause of the overheat condition.

FOR AFFECTED SYSTEM
APPLY PROCEDURE : SHUT DOWN OF AIR
CONDITIONING GROUPS

END//

NOTE

If the warning light remains on 2 minutes after selecting the Bleed Valve shut, this indicates a possible hot air leak within the nacelle. Continued operation of the affected engine is permitted.

AIR CONDITIONING

DUCT LIGHT ON

CAUTION
DO NOT ATTEMPT TO RESET THE DUCT DETECTION SYSTEM BY PRESSING THE DUCT LIGHT.

COND VALVE ....OFF E

Set the associated COND VALVE selector to OFF to confirm auto closure and de-activate the latched shut position.

IF THE COND VALVE, BLEED VALVES AND CROSSBLEED MIs SHOW CROSSLINE
CROSSBLEED VALVES sws ....SHUT E

Set associated CROSSBLEED switches to SHUT.

APPLY PROCEDURE : SHUT DOWN OF AIR CONDITIONING GROUPS (SHUT DOWN OF ONE GROUP)

CAUTION
UNDER NO CIRCUMSTANCES MAY THE AFFECTED BLEED VALVE AND CROSSBLEED VALVES BE OPENED.

IF THE BLEED VALVE MIs SHOW INLINE
DUCT LT .... MONITOR E

IF THE DUCT LT REMAINS ON
APPLY PROCEDURE : SHUT DOWN OF AIR CONDITIONING GROUPS (SHUT DOWN OF ONE GROUP)

IF THE DUCT LT GOES OFF
FUEL EXCH LT .... OBSERVE E

contd.

AIR CONDITIONING

IF THE FUEL EXCH LT ON

FUEL VALVE .... OPEN E

Set the associated FUEL VALVE selector to OPEN since an overheat condition at the fuel heat exchanger latches the FUEL EXCH light and latches the fuel valve. Setting the selector to open confirms auto operation to open and de-activates the latch of valve and FUEL EXCH light.

FUEL VALVE .... AS REQUIRED E

Set the associated FUEL VALVE selector to OPEN or SHUT to make its MI agree with FUEL VALVE MI indications of other systems.

IF THE FUEL EXCH LT OFF

TEMPERATURE SELECTOR .... STANDBY E

Set the required duct temperature on the STANDBY arc of the associated temperature selector.

COND VALVE .... ON E

Set the associated COND VALVE selector to ON and observe the conditioning valve MI inline.

Adjust the temperature as required, monitoring the corresponding compartment temperature and DUCT temperature.

END//

ABNORMAL RATE OF CLIMB AFTER TAKE-OFF

The normal cabin rate of climb is approximately 400 ft/min

GROUND PRESSURE RELIEF VALVE MI .... OBSERVE E

The ground pressure relief valve should automatically shut when the aircraft is airborne.

IF MI READS OPEN
GROUND PRESSURE RELIEF VALVE .... SHUT E

Set GROUND PRESSURE RELIEF VALVE selector to SHUT 1 or SHUT 2. There are two separate motors, either will shut the valve.

DISCHARGE VALVE POSITION INDICATOR .... OBSERVE

Observe DISCHARGE VALVE POSITION INDICATOR

IF DISCHARGE VALVE OF UNSELECTED SYSTEM IS OPEN
DISCHARGE VALVE .... SHUT E

Set selector for unselected system open discharge valve to FWD SHUT or AFT SHUT as appropriate.

IF VALVE REMAINS OPEN
REPLAN FLIGHT

END//

IF DISCHARGE VALVE OF SELECTED SYSTEM IS ABNORMALLY OPEN
SYSTEM SELECT sws ....OTHER SYSTEM E

Set the SYSTEM SELECT switches to other selection.

IF VALVE REMAINS ABNORMALLY OPEN
DISCHARGE VALVE .... SHUT E

Set DISCHARGE VALVE selector to FWD SHUT or AFT SHUT as appropriate.

IF VALVE REMAINS OPEN
REPLAN FLIGHT

END//

AIR CONDITIONING

BLEED OVERPRESSURE AND/OR OVERPRESS LIGHT ON

BLEED VALVE .... SHUT E

Set the associated BLEED VALVE switch to SHUT since an overpressure condition latches on the OVERPRESS light and shuts and latches the BLEED VALVE. Setting the switch to SHUT confirms auto closure and de-activates the latch of valve and OVERPRESS light.

COND VALVE .... OFF E

Set the COND VALVE selector to OFF to prevent surge in conditioning system when BLEED VALVE is subsequently opened.

BLEED VALVE .... OPEN E

Set BLEED VALVE to OPEN and observe the bleed pressure gauge reads approximately 75 psi.

IF BLEED PRESSURE 85 PSI AND/OR OVERPRESS LT ON

BLEED VALVE .... SHUT E

Set associated BLEED VALVE switch to SHUT

CROSS BLEEDS .... OPEN E

Set the associated CROSS BLEED sws (2) to OPEN and observe the bleed pressure gauge reading normal pressure.

COND VALVE .... ON E

Set COND VALVE selector to ON.

END//

PRIM EXCH LIGHT ON

COND VALVE .... OFF E

Set the associated COND VALVE selector to OFF since an overheat condition latches the PRIM EXCH light on and closes and latches the COND VALVE. Setting the selector to SHUT confirms auto closure and de-activates the latch of valve and PRIM EXCH light.

Observe the CAU IN temperature decreasing.

WAIT THREE MINUTES

▶ IF PRIM EXCH LT OFF

COND VALVE .... ON E

Set associated COND VALVE selector to ON.

Observe the PRIM EXCH light remains off

IF PRIM EXCH LT ON

APPLY PROCEDURE:SHUT DOWN OF AIR CONDITIONING GROUPS

END//

SEC EXCH LIGHT ON

COND VALVE .... OFF E

Set the associated COND VALVE selector to OFF since an overheat condition latches the SEC EXCH light on and closes and latches the COND VALVE. Setting the selector to SHUT confirms auto closure and de-activates the latch of valve and SEC EXCH light.

Observe the CAU IN temperature decreasing.

WAIT THREE MINUTES

IF SEC EXCH LT OFF

COND VALVE .... ON E

Set associated COND VALVE selector to ON.

Observe the SEC EXCH light remains off

IF SEC EXCH LT ON

APPLY PROCEDURE:SHUT DOWN OF AIR CONDITIONING GROUPS

END//

LOSS OF AUTOMATIC TEMPERATURE CONTROL

TEMPERATURE SELECTOR .... STANDBY E

Manually control the temperature, with the rotary selector at STANDBY, by adjusting the setting to obtain a reading between 20° and 24° on the temperature indicator of the affected compartment.

Once the temperature rotary selector is in the STANDBY arc, the required duct temperature is set on the numerical scale (graduated in degrees X10).

NOTE
With STANDBY temperature control system in use, COLD or negative settings may only be used at altitudes greater than 30,000 ft.

IF DUCT TEMPERATURE CAN BE CONTROLLED
END//

IF DUCT TEMPERATURE CANNOT BE CONTROLLED
APPLY PROCEDURE: SHUT DOWN OF AIR CONDITIONING GROUPS

END//

BLEED VALVE MALFUNCTION

BLEED VALVE .... SHUT E

Set associated BLEED VALVE switch to SHUT.

COND VALVE .... OFF E

Set associated COND VALVE selector to OFF.

CROSS BLEEDS .... OPEN E

Set the associated CROSS BLEED sws (2) to OPEN

The cross bleed valves open allow cross bleeding between two adjacent supplies on the same side of the aircraft.

WHEN BLEED PRESSURE IS READING NORMAL
COND VALVE .... ON

Set associated COND VALVE selector to ON

Observe COND VALVE MI inline within 30 secs.
Bleed pressure will be normal when the other system on that side is operating.

END//

LEAK LIGHT ON

MASS FLOW .... MONITOR E

IF MASS FLOW INDICATION SHOWS BELOW THE GREEN ARC
APPLY PROCEDURE: SHUT DOWN OF AIR CONDITIONING GROUPS

IF MASS FLOW DOES NOT FALL BELOW GREEN ARC
CONTINUE WITH NORMAL PROCEDURES

END//

COMPARATOR LIGHT ON

COMPARATOR LIGHT .... MONITOR E

IF COMPARATOR LIGHT STILL ON AFTER TEN MINUTES
GROUP 3 OR 4 sw .... FAILED E

GROUP 3 TEMPERATURE SELECTOR .... STANDBY 1 E

GROUP 3 OR 4 switch at FAILED unslaves group 3 from group 4 leaving both under AUTO control.

Group 3 is set to STANDBY control and to a fixed medium temperature so that group 4 continues to control the compartment temperature. This avoids any cycling of temperature demand between the two groups.

IF COMPARATOR LIGHT OFF
CONTINUE WITH NORMAL PROCEDURES

END//

FUEL/AIR EXCHANGER OVERHEAT

FUEL VALVE .... OPEN E

Set the associated FUEL VALVE selector to OPEN since an overheat condition at the fuel heat exchanger latches the FUEL EXCH light and latches the fuel valve: setting the selector to open confirms auto operation to open and deactivates the latch of valve and FUEL EXCH light.

FUEL VALVE ....AS REQUIRED E

Set the associated FUEL VALVE selector to OPEN or SHUT to make its MI agree with FUEL VALVE MI indications of other systems.

RETURN TO NORMAL PROCEDURES

END//

LOSS OF MASS FLOW

TEMPERATURE SELECTORS .... CHECK E

For the affected group, set the TEMPERATURE SELECTORS rty sel(s) from COLD to HOT in STANDBY mode, then back to AUTO. Observe the temperature control valve position indicator moving from C to H.

The mass flow valve has no magnetic indicator to monitor its position. Thus the selection COLD to HOT is to check that the mass flow valve has opened and the temperature control valve is operating.
Because the temperature control valve is a pneumatic servo, it requires mass flow to operate.

IF TEMPERATURE CONTROL VALVE IS NOT MOVING
COND VALVE .... OFF E

Set associated COND VALVE selector to OFF

Apply procedure: SHUT DOWN OF AIR CONDITIONING GROUPS

IF TEMPERATURE CONTROL VALVE POSITION INDICATOR SHOWS MOVEMENT FROM C TO H
RETURN TO NORMAL PROCEDURES.

END//

(Unchanged)

USE OF PASSENGER OXYGEN

CABIN ALTITUDE EXCEEDS 14,000 FT

When the cabin altitude exceeds 14,000 ft the oxygen regulator ouput pressure is increased to approximately 90 psi. This emergency pressure opens the therapeutic valve, thus pressurizing the passenger mask supply line. The emergency pressure in the passenger mask supply line causes automatic presentation of the mask units in the cabin. The oxygen will flow continuously when the mask is pulled down on to the users face.

If the cabin altitude stabilizes below 18,000 ft the oxygen regulator output pressure is decreased to normal pressure. The passenger masks are operating on demand.

EMERG LT .... OBSERVE E

The EMERG light (yellow) should be observed on indicating that the pressure in the passenger mask supply line exceeds 70 psi.

IF EMERG LIGHT OFF

PASSENGER SUPPLY PRESSURE INDICATOR .... OBSERVE E

The PASSENGER SUPPLY PRESSURE indicator pressure should be observed.

IF PASSENGER SUPPLY PRESSURE SHOWS GREATER THAN 85 PSI

NO FURTHER ACTION

IF PASSENGER SUPPLY PRESSURE SHOWS LESS THAN 85 PSI

PASSENGER SYSTEM EMERG
MANUAL O/RIDE sw .... ON E

Lift guard and set PASSENGER SYSTEM EMERG MANUAL O/RIDE switch to ON thereby electrically overriding the barometric control of the regulator thus pressurizing the passenger mask supply line at emergency pressure.

EMERG LT .... OBSERVE E

IF EMERG LIGHT OFF

EMERGENCY MANUAL OVERRIDE .... PULL ON S

Request cabin staff to lift guard and pull EMERGENCY MANUAL OVERRIDE knob.

Pulling the EMERGENCY MANUAL OVERRIDE knob mechanically overrides the barometric control of the regulator thus pressurizing the passenger mask supply line at emergency pressure.

contd.

The supply will remain at emergency pressure until the EMERGENCY MANUAL OVERRIDE knob is pushed back.

WHEN CABIN ALTITUDE STABILIZES AT OR SUBSEQUENTLY FALLS BELOW 16,500 ft.

EMERG LT .... OBSERVE E

If the cabin altitude returns to less than 16,500 ft and the EMERG light (yellow) remains on, the only means to stop loss of oxygen, due to continuous flow, is to restow the check valve of each non-required passenger mask into the corresponding clip located in the stowage box.

PASSENGER SYSTEM EMERG
MANUAL O/RIDE sw ....OFF E

Set PASSENGER SYSTEM EMERG MANUAL O/RIDE switch to OFF.

Once the PASSENGER SYSTEM EMERG MANUAL O/RIDE switch is set to OFF it leaves the therapeutic control valve open thus keeping the passenger mask supply line at normal pressure.

EMERGENCY MANUAL OVERRIDE .... PUSH OFF S

Request cabin staff to push back EMERGENCY MANUAL OVERRIDE knob.

Once the EMERGENCY MANUAL OVERRIDE knob is pushed back it leaves the therapeutic supply valve open thus keeping mask supply line at normal pressure.

END//

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ANTI-ICING LEFT & RIGHT INT & CYCLIC LIGHTS ON

● ▶ TOTAL TEMPERATURE IS GREATER THAN +15°C
WING & INTAKE ANTI-ICING
rty sels (2) .... OFF E

Verify both WING & INTAKE ANTI-ICING rotary selectors at OFF.

If the wing and intake anti-icing system is switched on with the total temperature greater than +15°C, or with the aircraft on the ground, the CYCLIC and INT lights will come on.

If the aircraft lands with the wing and intake anti-icing switched on, the CYCLIC and INT lights will come on.

END//

● ▶ TOTAL TEMPERATURE IS LESS THAN +15°C
WING & INTAKE ANTI-ICING
SELECTED rty sel .... OFF E

Set selected WING & INTAKE rotary selector to OFF.

If, in flight, the total temperature is below +15°C, INT lights (2) (yellow) are on and CYCLIC lights (2) (yellow) on together indicate a failure of the control lane.

WING & INTAKE ANTI-ICING
OTHER rty sel .... 4 SECS ON E

Set the other WING & INTAKE ANTI-ICING rotary selector to 4 SECS ON position and observe INT & CYCLIC lights off.

▶ IF LEFT OR RIGHT INT LT ON
LE//

▶ IF CYCLIC LT ON
APPLY PROCEDURE : ANTI-ICING CYCLIC LIGHT ON

IF LEFT AND RIGHT INT & CYCLIC LTS REMAIN ON
WING & INTAKE ANTI-ICING
ALTERN rty sel .... 4 SECS ON E

Verify the WING & INTAKE ANTI-ICING ALTERN rotary selector is at 4 SECS ON

TEMP O/RIDE pb .... PRESS E

Press and hold the TEMP O/RIDE push button, observe the INT and CYCLIC lights off.

ICE AND RAIN PROTECTION

Pressing the TEMP O/RIDE push button with ALTERN selected will override the ADC signal if it is giving a false output showing above +15°C.

If the ADC is in a power failed condition it will give an output showing above +15°C

IF LEFT AND RIGHT INT & CYCLIC LTS REMAIN ON LEAVE ICING CONDITIONS

END//

(Unchanged)

ANTI-ICING INT LIGHT ON

●▶ WITH WING & INTAKE ANTI-ICING MAIN OR ALTERN rty sel AT 4 SECS ON

LE//

Observe and log entry the number of the light on the CYCLIC AND CONTINUOUS DE-ICING diagnosis and test panel.

END//

●▶ WITH WING & INTAKE ANTI-ICING rty sels (2) AT OFF
CONTINUOUS DE-ICING AC POWER C/B's ....TRIP E

Trip the associated AC circuit breakers

CIRCUIT BREAKER	PANEL	GRID REF
LH WING CONTN IND	15-216	B15
INT 4 REAR RAMP HTR SUP	14-216	A14
INT 4 AUX DOOR D BOX HTR SUP	14-216	A15
RH WING SECT 13.7,15.3 HTRS CONTN SUP	14-216	B12
RH WING SECT 14.1,14.2 HTRS CONTN SUP	14-216	B13
RH WING FAIRING & SECT 13. HTRS CONTN SUP	14-216	B15
RH WING SECT 13.5,13.6 HTRS CONTN SUP	14-216	C12
RH WING SECT 15.1,15.2 HTRS CONTN SUP	14-216	C13
RH WING SECT 13.2,13.3 & 13.4 HTRS CONTN SUP	14-216	C15
INT 3 AUX DOOR D BOX HTR SUP	13-216	A10
INT 3 REAR RAMP HTR SUP	13-216	A11
INT 2 AUX DOOR D BOX HTR SUP	13-215	A 9
INT 2 REAR RAMP HTR SUP	13-215	A10
INT 1 REAR RAMP HTR SUP	14-215	B 6
INT 1 AUX DOOR D BOX HTR SUP	14-215	B 7

ICE AND RAIN PROTECTION

LH WING SECT 13.7, 15.3 HTRS CONTN SUP	14-215	C 6
LH WING SECT 14.1,14.2 HTRS CONTN SUP	14-215	C 7
LH WING FAIRING & SECT 13.1 HTRS CONTN SUP	14-215	C 8
LH WING SECT 13.5, 13.6 HTRS CONTN SUP	14-215	D 6
LH WING SECT 15.1, 15.2 HTRS CONTN SUP	14-215	D 7
LH WING SECT 13.2,13.3 & 13.4 HTRS CONTN SUP	14-215	D 8
RH WING CONTN IND	15-215	B11

END//

ANTI-ICING CYCLIC LIGHT ON

● ▶ WING & INTAKE ANTI-ICING rty sels (2) AT OFF

WING & INTAKE ANTI-ICING
DC C/Bs .... TRIP E

Trip associated circuit breakers.

CIRCUIT BREAKER	PANEL	GRID REF
LH WING CONTN IND	15-216	B15
RH CYCLIC TIMER CONT	15-216	D14
RH WING CONTN IND	15-215	B11
LH CYCLIC TIMER CONT	3-213	B11

END//

● ▶ WING & INTAKE ANTI-ICING MAIN OR ALTERN rty sel AT 4 SECS ON

CYCLIC LT ....OBSERVE E

▶ IF CYCLIC LT ON STEADY FOR MORE THAN 16 SECS

WING & INTAKE ANTI-ICING
rty sel .... OFF E

Set selected WING & INTAKE rotary selector to OFF.

CYCLIC light on steady indicates that a fault which could cause damage has been detected in a cyclically heated area. The cyclic de-icing system for that side of the aircraft is shut down.

▶ IF CYCLIC LT REMAINS ON

WING & INTAKE ANTI-ICING
DC C/Bs ....TRIP E

Trip associated circuit breakers

CIRCUIT BREAKER	PANEL	GRID REF
LH WING CONTN IND	15-216	B15
RH CYCLIC TIMER CONT	15-216	D14
RH WING CONTN IND	15-215	B11
LH CYCLIC TIMER CONT	3-213	B11

LEAVE ICING CONDITIONS

END//

IF CYCLIC LT OFF

WING & INTAKE ANTI-ICING
rty sel ....4 SECS ON E

contd.

ICE AND RAIN PROTECTION

CYCLIC LT ....PRESS AND RELEASE E

Press and release the CYCLIC light and observe the CYCLIC light is off.

A cyclic de-icing system which has automatically shut down after detecting a fault can be restarted by setting the rotary selector momentarily to OFF and then pressing the relevant CYCLIC light.

IF CYCLIC LT ON
LEAVE ICING CONDITIONS

CAUTION
RESET OF THE CYCLIC DE-ICING SYSTEM MUST NOT BE REPEATED.

IF CYCLIC LT OFF AFTER A MAXIMUM OF 16 SEC
FAULTY AREA ....LOG E

Observe and log entry the number shown by the digital indicator on the CYCLIC AND CONTINUOUS DE-ICING diagnosis and test panel.

END//

(Unchanged)

MAST LIGHT ON

DRAIN MAST HTRS .... OTHER ON POSITION E

Set the associated DRAIN MAST HTRS selector to the alternative ON position and observe the MAST lights off.

IF MAST LT REMAINS ON
DRAIN MAST HTRS .... OFF E

Set the associated DRAIN MAST HTRS selector to OFF. Inform the senior cabin crew member of lost drain facility.

NOTE
In subsonic flight any washbasin associated with a lost drain facility must be placarded "Not to be used".

END//

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W/SHIELD DE-ICE O/HEAT LIGHT ON

W/SHIELD DE-ICE O/HEAT LT ....OBSERVE E

Observe the W/SHIELD DE-ICE O/HEAT light. If the light is on and off for short periods it indicates the system is operating safely on overheat control.

IF W/SHIELD DE-ICE O/HEAT LT ON STEADY
W/SHIELD EMERGY DE-ICE sws (2) .... OFF E

Verify the W/SHIELD EMERGY DE-ICE switches (2) are OFF and guarded.
It should be observed the W/SHIELD DE-ICE O/HEAT light is off and the W/SHIELD DE-ICE MIs read inline and crossline for short periods.

The W/SHIELD DE-ICE MIs read inline when power is supplied to the windshield.
The W/SHIELD DE-ICE MIs read crossline when windshield heat has reached control temperature and power is off. If the system is switched off the MIs read crosshatched.

IF W/SHIELD DE-ICE MI READS INLINE STEADY AND O/HEAT LT ON
W/SHIELD DE-ICE .... OFF E

Set the associated W/SHIELD DE-ICE switch to OFF

W/SHIELD DE-ICE CBs .... TRIP E

Trip the associated a.c. circuit breaker.

CIRCUIT BREAKER	PANEL	GRID REF
L/H W/SCREEN HTR SUP	2-213	E 20
R/H W/SCREEN HTR SUP	14-216	F 11

A W/SHIELD DE-ICE O/HEAT light on steady with the associated MI reading inline steady indicates an uncontrolled power supply to the heated panels, hence the necessity to break the supply.

END//

VISOR DE-ICE O/HEAT LIGHT ON

VISOR DE-ICE O/HEAT LT .... OBSERVE E

Observe the VISOR DE-ICE O/HEAT light. If the light is on and off for short periods it indicates the system is operating safely on overheat control.

IF VISOR DE-ICE O/HEAT LT ON STEADY

VISOR DE-ICE .... OFF E

Set the associated VISOR DE-ICE switch to OFF.

VISOR DE-ICE CBs ....TRIP E

Trip the associated a.c. circuit breakers.

CIRCUIT BREAKER	PANEL	GRID REF
LH BOTTOM VISOR HTR SUP	14-215	E 9
LH FLAT VISOR HTR SUP	14-215	G 5
LH CURVED VISOR HTR SUP	14-215	G 8
RH BOTTOM VISOR HTR SUP	13-216	B10
RH CURVED VISOR HTR SUP	13-216	G10
RH FLAT VISOR HTR SUP	13-216	G13

END//

DV DEMIST O/HEAT LIGHT ON

DV DEMIST O/HEAT LT .... OBSERVE E

Observe the DV DEMIST O/HEAT light. If the light is on and off for short periods it indicates the system is operating safely on overheat control.

IF DV DEMIST O/HEAT LT ON STEADY

DV DEMIST .... OFF E

Set the associated DV DEMIST switch to OFF

DV DEMIST CB ....TRIP E

Trip the associated a.c. circuit breaker.

CIRCUIT BREAKER	PANEL	GRID REF
LH DV WINDOW HTR SUP	14-215	D 9
RH DV WINDOW HTR SUP	13-216	C10

END//

ADS/ENGINE PROBE HEATER LT ON

CAUTION
THE ADS 1, ADS 2 AND STBY PROBE HEATERS
MUST NOT BE SET TO OFF DURING FLIGHT.

IF T_1 (1,2,3 or 4) LT ON

ASSOCIATED ENGINE THROTTLE MASTER ....ALTERN E

Set the associated engine THROTTLE MASTER sel to ALTERN

ADJACENT ENGINE THROTTLE MASTER .... MAIN E

Set the adjacent engine THROTTLE MASTER sel to MAIN

END//

Should any other ADS or ENGINE PROBE HEATERS light be on regard data from the unheated sensor(s) as suspect during or after encounter with icing conditions.

(Unchanged)

INDICATION	MALFUNCTION
STBY	Captain's standby ASI/MACHMETER Captain's and first officer's AIRSPEED indicator and altimeter in standby mode. Air intake sensor unit No.2 (Lane 2A) (Lane 3B)
S or P (LH)	ADC 1 Air intake sensor unit No.1 (Lane 1A) (Lane 4B)
S or P (RH)	ADC 2 Air intake sensor unit No.3 (Lane 4A) (Lane 1B) Air intake sensor unit No.4 (Lane 3A) (Lane 2B)
β α or T_t (LH)	ADC 1
β α or T_t (RH)	ADC 2
NOTE:	α probe malfunction is displayed as total intake incidence signal failure.

END//

ICE AND RAIN PROTECTION

WINDSHIELD EMERGENCY DE-ICING

CAUTION

ONLY USE WINDSHIELD EMERGENCY DE-ICING IF LOSS OF VISION, THOUGHT TO BE DUE TO LACK OF HEATING, IS LEADING TO A DANGEROUS SITUATION.

CAUTION

WINDSHIELD EMERGENCY DE-ICING MUST NOT BE USED UNLESS THE VISOR IS DOWN AND CABIN DIFFERENTIAL PRESSURE IS LESS THAN 2.5 PSI.

CAUTION

IF WINDSHIELD EMERGENCY DE-ICING IS USED WHEN THE AIRCRAFT IS ON THE GROUND THERE IS A DANGER OF CRACKING THE GLASS.

W/SHIELD EMERGY DE-ICE sw(s)............................ ON CE

Set W/SHIELD EMERGY DE-ICE switch(es) ON as appropriate.

With the W/SHIELD EMERGY DE-ICE switch at ON the associated W/SHIELD DE-ICE MI will not indicate system operation and the associated O/HEAT light will be ON.

Switch OFF W/SHIELD EMERGY DE-ICE as soon as practicable.

END//

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IF THE ENG O/HEAT LT IS OFF AT ONE OR MORE TEST POSITIONS F1,F2 OR F3

FLAME SENSORS sel .... ALTERNATIVE
A OR B POSN E

Set associated FLAME SENSORS selector to the alternative A or B position.

The ENGINE O/HEAT light off at any of the F1,F2 or F3 positions indicates the flame sensor loop under test is not serviceable. The FLAME SENSOR warning from the loop not under test must therefore be regarded as a true warning.

ON ILLUMINATION OF THE RED ENG MWS AND ENGINE SHUT DOWN HANDLE LTS FOR THE AFFECTED ENGINE
APPLY PROCEDURE : ENGINE FIRE OVERHEAT OR SEVERE DAMAGE

END//

FIRE SENSOR LIGHT ON

Set associated FIRE SENSOR selector to A or B so that the associated FIRE SENSOR light remains off.

Continue operation with selected single loop operating.

END//

(Unchanged)

WHEEL BRAKE FIRE

This drill is not published in expanded form.

Refer to abnormal drill Vol.2B. 07.13.06

AMBER RADIATION LIGHT ON

OBTAIN PROVISIONAL ATC CLEARANCE FOR DESCENT IN THE EVENT THAT RADIATION REACHES THE "ACTION" LEVEL (RED RADIATION LIGHT ON).

Radiation meter dose rate pointer in the amber segment indicates instantaneous radiation level is heading toward "action" level.

END//

RED RADIATION LIGHT ON

CONFIRM ATC CLEARANCE AND ADVISE DESCENDING

Air/Ground communication may be interrupted by solar cosmic radiation.

Instantaneous radiation level in excess of 50 millirems per hour does not justify an emergency uncleared descent to or through a flight level occupied by underflying aircraft.

The appropriate ATC unit must be advised, as soon as possible, of action which has been taken during any period of interrupted communication.

DESCEND TO AN ALTITUDE SUCH THAT INTENSITY IS BELOW "ACTION" LEVEL I.E. THE RED RADIATION LIGHT OFF.

Cosmic radiation intensity decreases with descent.

IF WARNING PERSISTS BELOW FL 470
NO FURTHER ACTION

If the red radiation light remains on or the radiation meter dose pointer is above 50 millirems per hour below 47000 ft then a false indication should be suspected. consult meteorological data for forecast radiation level.

Replan for flight at new flight level.

NOTE

If due to communication failure descent clearance cannot be obtained descent is at the captain's discretion.

END//

MWS HEALTH MONITOR

AUDIO CANCEL pb ....PRESS AND RELEASE P

NOTE

The health monitor audio (gong) at one second intervals indicates either.
- loss of the master warning primary gong or
- total loss of the master warning system.

SYSTEM LIGHT ....PRESS E

Press any red or amber system light which is connected to the master warning system.
Observe the associated MWS light.

IF MWS LIGHT ON, BUT NO AUDIO
SYSTEM LIGHT .... RELEASE E

BRIEF FOR FLIGHT WITH MWS PRIMARY GONG INOPERATIVE

NOTE

The auxiliary gong is still operative and will give an audio (gong) every ten seconds if a class 1 (red) light remains on and unrecognised.

END//

IF MWS LIGHTS OFF
SYSTEM LIGHT ....RELEASE E

BRIEF FOR FLIGHT WITH MWS TOTALLY INOPERATIVE

END//

DOORS WARNING WITH AIRCRAFT PRESSURIZED

●▶ IF UPPER CARGO OR LOWER CARGO OR MISC HATCHES LT(S) ON
CABIN DIFFERENTIAL PRESSURE .... MAINTAIN ABOVE
1.0 PSI FOR
REMAINDER OF FLIGHT

END//

●▶ IF FRONT LEFT OR FRONT RIGHT OR CENTRE LEFT OR CENTRE RIGHT OR REAR LEFT OR REAR RIGHT DOOR LT(S) ON
ASSOCIATED DOOR HANDLE ....OBSERVE POSITION E

PRESSURISATION .... CHECK E

▶ IF DOOR HANDLE POSITION IS CORRECT
AND
IF PRESSURISATION IS STABLE WITHOUT EVIDENCE OF LEAKAGE
NO FURTHER ACTION

CAUTION
DO NOT MOVE HANDLE

With the aircraft correctly pressurized and with the door locking handle in the correct position the door is secure.

END//

IF THE DOOR HANDLE POSITION IS NOT CORRECT
OR
IF THE PRESSURIZATION IS UNSTABLE
OR
IF THERE IS EVIDENCE OF LEAKAGE
EMERGENCY DESCENT PROCEDURE ....APPLY C
CABIN DIFFERENTIAL PRESSURE ....REDUCE TO
1.0 PSI E

END//

CAUTION
MAINTAIN CABIN DIFFERENTIAL AT 1.0 PSI
UNTIL AFTER LANDING.

CONDITIONAL PROCEDURES

LIST OF CONTENTS

POWER PLANT

Use of reverse thrust in flight 04.01.01
Dry motoring cycle 04.01.04
Cross bleed start 04.01.05

FUEL SYSTEM

Use of fuel fwd trans switch 04.02.01
Crossfeed 04.02.02
Continuous running of scavenge pump in flight 04.02.03
Lateral trim 04.02.04
Longitudinal trim 04.02.06
CG aft of 59% 04.02.07

LANDING GEAR

Reinstatement of landing gear after test standby lowering 04.07.01
Reinstatement of landing gear after test of free fall 04.07.02

NOSE AND VISOR

Reinstatement of normal system after test of standby or emergency system 04.08.01

OXYGEN

Use of crew oxygen 04.11.01
Use of passenger/crew oxygen interconnection 04.11.02

ICE AND RAIN PROTECTION

Windshield wipers and rain repellent 04.12.01
Engine anti-icing 04.12.03
Ice warning received in flight or known icing conditions existing 04.12.04

(Unchanged)

contd.

CONDITIONAL PROCEDURES

LIST OF CONTENTS

MISCELLANEOUS

USE OF JP 4 TYPE FUEL

Introduction 04.14.01
Dispatch deviations 04.14.01
Limitations 04.14.01
Aircraft Handling 04.14.03
Performance 04.14.03
Alterations to Normal Procedures during use of JP 4 type fuel 04.14.04
Fuel temp exceeds 50°C (Drill) 04.14.07
Fuel filter light on (Drill) 04.14.07
Fuel temp exceeds 50°C (Expanded Procedure) 04.14.08
Fuel filter light on (Expanded Procedure) 04.14.09
Crossfeed 04.14.10
False Start 04.14.11

TAKE-OFF WITHOUT REHEAT

Introduction 04.14.13
Dispatch deviations 04.14.13
Aircraft handling 04.14.13
Performance 04.14.13
Alterations to Normal Procedures for take-off without reheat 04.14.14

AIDS Limit Light On or Data Recall Required 04.14.15

Transit Handling Guidance 04.14.16

USE OF REVERSE THRUST IN FLIGHT

Aircraft must be within flight envelope for in-flight use of reverse thrust.

The procedures for in-flight reverse thrust are based on the use of both inner engines. If reverse thrust is selected on one inner engine only, the change in area and increase in idle speed on the adjacent engine apply only to the side on which reverse thrust is selected.

THROTTLES...IDLE C

FLIGHT REV ARM pb.......................................PRESS E

Press the FLIGHT REV ARM push button and observe OPEN light on.

IF OPEN LT OFF
Do not use reverse thrust in flight.

END//

REVERSE..SELECT C

Lift No.2 and No.3 reverse thrust levers to the reverse baulk position and observe No.2 and No.3 REV lights flashing then remain on, No.2 and No.3 CON lights off.

Transit into reverse should be accomplished within about 10 seconds and the area should be less than 15% within 15 seconds of reverse thrust selection. If at the extremes of the flight envelope the buckets fail to achieve reverse (REV light remains flashing), cancel reverse thrust and reselect as required at a lower altitude.

The N2 of engines No.2 and No.3 will increase to reverse idle speed, and their primary nozzle areas will increase to maximum during their bucket movement, and reduce to less than 15% after the buckets are closed. The N2 of engines No.1 and No.4 increases slightly during the movement of engines No.2 and No.3 buckets, and then reduces to their prevailing idle when the buckets are closed. During the use of reverse thrust in flight, the baulk preventing power being applied on reversing engines is not removed when the buckets are closed.

(Completely Revised)

contd.

IF CON LT(S) ON
Observe AREA instrument.

IF AREA LESS THAN 15%
Continue use of reverse thrust.

IF AREA GREATER THAN 15%
Cancel reverse thrust on associated engine.

With the primary nozzle area greater than 15% over heating of the secondary nozzle could occur, even with the power at idle, because of the length of time use of reverse thrust is permitted in flight.

END//

IF REV LT(S) OFF OR REMAIN FLASHING
Cancel reverse thrust on associated engine.

END//

WHEN CANCELLATION OF REVERSE THRUST IS REQUIRED

REVERSE LEVERS..............................FORWARD BAULK C

Push No.2 and No.3 reverse thrust levers to the forward baulk position, and observe No.2 and No.3 REV lights flashing then remain off.

The N2 of engines No.2 and No.3 will reduce by approximately 4% and their primary nozzle areas will return to their normal scheduled area.
The N2 of engines No.1 and No.4 increases slightly during the movement of engines No.2 and No.3 buckets and then to their prevailing idle when the reverse thrust levers of engines No.2 and No.3 are pushed fully down.

IF REV LT(S) ON OR FLASHING INTERMITTENTLY
observe associated SECONDARY NOZZLE instrument(s)

IF ASSOCIATED BUCKETS NOT WITHIN THE RANGE 0-27 DEG
Set the HP VALVE to SHUT.
Apply procedure: PRECAUTIONARY ENGINE SHUT DOWN

contd.

(Completely Revised)

IF ASSOCIATED REV LTS OFF OR BUCKETS ARE WITHIN 0-27 DEG

REVERSE LEVERS.....................................IDLE C

Push No.2 and No.3 reverse thrust levers fully down and observe N2 of No.2 and No.3 engines return to prevailing idle.

IF REVERSE THRUST LEVERS CANNOT BE MOVED PAST THE FORWARD BAULK POSITION

BAULK OVERRIDE HANDLE..........................OVERRIDE P

Lift and turn clockwise forward BAULK O/RIDE handle.

REVERSE LEVERS.....................................IDLE C

CAUTION
IF THE FORWARD BAULK O/RIDE HAS BEEN USED IT MUST BE RESET IMMEDIATELY THE REVERSE THRUST LEVERS ARE FULLY DOWN.

Advance throttle levers as required and observe OPEN light off.

When any of the throttle levers is advanced more than 10% from idle the magnetic latch of the FLIGHT REV ARM button is released, disarming the in-flight reverse system which causes the air supply isolation valves to shut.

IF OPEN LT ON
Pull FLIGHT REV ARM button and observe OPEN light off.

END//

CAUTION
IF THE OPEN LIGHT ON AND/OR FLIGHT REV ARM PUSH BUTTON FAILS IN THE ARMED POSITION, DO NOT MOVE THE REVERSE THRUST LEVERS OF No.2 AND No.3 ENGINES ABOVE REVERSE IDLE DURING THE USE OF REVERSE THRUST ON LANDING UNTIL THEIR PRIMARY NOZZLE AREAS IS LESS THAN 15%.

(Completely Revised)

DRY MOTORING CYCLE

If the engine OIL TEMP is colder than -35°C but not colder than -40°C, a dry motoring cycle should be carried out. This should raise the OIL TEMP to -35°C or warmer and it is then possible to proceed with a normal start.

COCKPIT PREPARATION AND PRE-START CHECKS .... COMPLETE ALL

DEBOW sw .... DEBOW E

Set associated DEBOW switch to DEBOW and observe DEBOW switch light (yellow) on.

START/RELIGHT sel .... START E

Set associated START/RELIGHT selector to START.

Observe START/RELIGHT selector is latched at START. START VALVE MI reads OPEN, ENGINE DEBOW switch light off, START PUMP light (yellow) on, N2 rises.

During the dry motoring cycle the air supply to the air turbine starter must be controlled to maintain N2 below 16% and duct pressure below 35 psig to prevent air turbine starter limitations being exceeded.

30 SECONDS AFTER SELECTING START/RELIGHT SELECTOR TO START

DEBOW sw ....NORMAL E

Set the associated DEBOW switch to NORMAL to terminate motoring cycle.

When the DEBOW switch is set to NORMAL the START/RELIGHT selector will unlatch and return to the OFF position causing the start valve to shut, this being indicated by the START VALVE MI.
The START PUMP will run for approximately 30 secs after DEBOW switch is set to NORMAL.

END//

(Completely Revised)

CROSS BLEED START

CAUTION
BEFORE INITIATING A CROSS-BLEED START THE GROUND AIR SUPPLY MUST BE DISCONNECTED AND THE START CONNECTION BLANKING CAP FITTED.

ON RUNNING ENGINE

BLEED VALVE .... OPEN E

Verify associated BLEED VALVE switch at OPEN and observe BLEED VALVE MI inline.

CROSSBLEED VALVE .... OPEN E

Set associated CROSSBLEED VALVE selector to OPEN and observe CROSSBLEED VALVE MI inline.

COND VALVE .... OFF E

Set associated COND VALVE selector to OFF observe COND VALVE MI Crossline.

THROTTLE .... AS REQUIRED E

Advance throttle lever of running engine to obtain 29-35 psi on associated bleed pressure gauge.

ADJACENT ENGINE .... START E

Start adjacent engine using normal starting technique.

WHEN ENGINE BEING STARTED OBTAINS 25% N2 AND ASSOCIATED START VALVE MI READS SHUT

THROTTLE .... IDLE E

Retard throttle lever of donor engine to idle.

AFTER ENGINE START

CROSS BLEED VALVE .... SHUT E

Set associated CROSS BLEED VALVE selector to SHUT and observe CROSS BLEED VALVE MI Crossline.

(Completely Revised)

contd.

⇩

COND VALVE .... ON E

Set donor engine COND VALVE selector to ON and observe COND VALVE MI inline.

END//

(Compl ly Revise

USE OF FUEL FWD TRANS SWITCH

FUEL FWD TRANS sw .... O/RIDE P

Unguard and set the FUEL FWD TRANS switch to O/RIDE. Monitor the forward movement of the CG.

The tank 11 pumps will continue to run and the tanks 5 and 7 inlet valves will remain open until the FUEL FWD TRANS switch is returned to its guarded position.

TRIM TRANS AUTO MASTER .... OFF E

Verify the TRIM TRANS AUTO MASTER selector at OFF.

The TRIM TRANS AUTO MASTER selector at OFF ensures that the transfer of fuel is solely under the control of the FUEL FWD TRANS switch and that when the FUEL FWD TRANS switch is returned to its guarded position normal fuel transfer does not resume.

WHEN CG AS REQUIRED

FUEL FWD TRANS sw .... GUARD P

Set the FUEL FWD TRANS switch to its guarded position.

END//

CROSSFEED

CAUTION

CROSSFEEDING IS NOT TO BE USED DURING TAKE-OFF OR LANDING.
THE MINIMUM ENGINE FEED PUMPS REQUIREMENT DURING OTHER PHASES OF FLIGHT IS:
- TWO PER ENGINE WITH T/O SELECTED
- THREE PER TWO ENGINES WITH REHEAT ON,
- ONE PER ENGINE DURING SUPERSONIC CRUISE,
- ONE PER TWO ENGINES DURING SUBSONIC CRUISE.

DO NOT FEED MORE THAN TWO ENGINES FROM A SINGLE TANK.

CROSSFEED .... AS REQUIRED E

Verify ENGINE FEED PUMPS switches of the collector tank in use to ON.
Rotate the CROSSFEED rotary selectors of the collector tank in use and the engines to be supplied to inline and observe crossfeed MIs in line.
Set the ENGINE FEED PUMPS switches of the unused collector tank to OFF.

WHEN CROSSFEED NO LONGER REQUIRED

ENGINE FEED PUMPS .... ALL ON E

Set all ENGINE FEED PUMPS switches to ON

CROSSFEED rty sels .... CROSSLINE E

Rotate CROSSFEED rotary selectors crossline and observe CROSSFEED MIs show crossline.

END//

CONTINUOUS RUNNING OF SCAVENGE PUMP IN FLIGHT

TRIM PIPE DRAIN sw ....SHUT E

Verify TRIM PIPE DRAIN switch is at SHUT to ensure fuel is not draining from trim transfer pipes into scavenge tank and causing pump to run.

SCAVENGE PUMP MI ....OBSERVE E

Observe SCAVENGE PUMP magnetic indicator

If the scavenge pump had been operating due to an open trim pipe drain valve it will continue to run while fuel remains in the scavenge tank.

IF SCAVENGE PUMP MI READS ON
CONTINUE NORMAL FLIGHT

Continue with fuel system normal procedures but carefully monitor fuel tank quantities and pressure.

END//

(Unchanged)

LATERAL TRIM

This procedure transfers fuel from the "down elevon" collector tank (2 or 3) to the "up elevon" main transfer tank (5 or 7) via tank 11.

FEED PUMPS .... ALL ON .... E

Set all Feed Pump sws to On and observe Pump Low Pressure lights out.

TANK 11 CONTENTS .... NOTE .... E

This figure will be the datum to which to restore tank 11 contents.

ON THE UP ELEVON SIDE

TANK 5 OR 7 INLET VALVE .... OPEN .... E

Set the tank 5 or 7 Inlet Valve selector, as appropriate, to OPEN.

TANK 11 ELECTRIC PUMP .... ON .... E

Set the tank 11 electric pump selector, that is on the same side of the aircraft as the "up elevon", to ON. This enables fuel to be transferred from tank 11 to tank 5 or 7 as appropriate.

ON THE DOWN ELEVON SIDE

TANK 11 INLET VALVE .... OPEN .... E

Set the tank 11 Inlet Valve selector, that is on the same side of the aircraft as the "down elevon", to OPEN. The valve will not open until tank 11 contents have fallen below high-level.

TANK 2 OR 3 JETTISON VALVE .... OPEN .... E

Set to OPEN the tank 2 or tank 3 Jettison Valve switch (on the same side as the opened tank 11 Inlet Valve). This enables fuel from the selected collector tank to transfer by engine feed pump action, via the opened jettison valve and trim transfer pipe, into tank 11.

WHEN ELEVONS ARE NEUTRAL IN ROLL

TANK 11 ELECTRIC PUMP .... AUTO .... E

Set the tank 11 electric pump selector to AUTO to stop the transfer from tank 11 to the selected main transfer tank.

TANK 5 OR 7 INLET VALVE .... AUTO .... E

This action closes the valve.

(Completely Revised)

Cont'd.

WHEN TANK 11 CONTENTS AT ORIGINAL VALUE OR HIGH LEVEL

TANK 11 INLET VALVE .... AUTO .... E

This action closes the valve and stops the transfer from the selected collector tank to tank 11. If high level was reached, the valve would already be closed.

TANK 2 OR 3 JETTISON VALVE .... SHUT .... E

This action closes the valve thus directing the 1st and 2nd standby pumps delivery to the engine.

END//

(Completely Revised)

LONGITUDINAL TRIM

This procedure is required when the elevon angle in pitch is outside the range 1 degree down to neutral.

●▶ IF THE ELEVONS ARE UP

TANK 1 & 4 sw .... AFT TRIM E

Set the Tank 1 & 4 switch to AFT TRIM and observe TANK 1 & 4 MI reads AFT.

Once the aft trim operation is initiated it should not be interrupted. If during the aft trim operation the elevons should move down greater than one degree, or the CG move aft of 59% do not stop the aft trim but apply procedure "IF THE ELEVONS ARE DOWN MORE THAN 1 DEG" or CG AFT OF 59%.

Observe the tank 1 & 4 quantities decrease and stabilize at approximately 2000 kg.

●▶ IF THE ELEVONS ARE DOWN MORE THAN 1 DEG

TANK 5 & 7 INLET VALVES .... OPEN E

Set the tank 5 and 7 INLET VALVE selectors to OPEN

TANK 11 PUMPS .... ON E

Set the tank 11 PUMPS left and right hand selectors to ON
Monitor the elevon angle on Flying Control Position Indicator.

WHEN ELEVON ANGLE HALF DEGREE DOWN.

TANK 11 PUMPS Sel .... AUTO E

Set tank 11 PUMPS selectors to AUTO

TANK 5 & 7 INLET VALVES .... AUTO E

Set tank 5 and 7 INLET VALVES selectors to AUTO

END//

CG AFT OF 59%

TANK 5 & 7 INLET VALVES .... OPEN E

Set tank 5 and 7 INLET VALVE selectors to OPEN

TANK 11 PUMPS .... ON E

Set tank 11 PUMPS left and right hand selectors to ON and monitor CG position.

WHEN CG is 59%

TANK 11 PUMPS .... AUTO E

Set tank 11 PUMPS left and right hand selectors to AUTO.

TANK 5 & 7 INLET VALVES .... AUTO E

Set tank 5 and 7 INLET VALVE selectors to AUTO.

END//

REINSTATEMENT OF LANDING GEAR AFTER TEST STANDBY LOWERING

L/GEAR NORMAL LEVER .... NEUTRAL P

Verify normal landing gear lever at NEUTRAL.

With the normal landing gear lever at NEUTRAL the landing gear door selector valves go to their neutral position thus removing green hydraulic pressure from the gear and door jacks. Therefore it is essential during this procedure to verify that the normal landing gear is at NEUTRAL to prevent the landing gear doors closing prematurely.

STANDBY LOWERING LEVER .... NEUTRAL E

Set the standby lowering lever to NEUTRAL and reset guard.

With the standby lowering lever at NEUTRAL the landing gear standby selector valve goes to the neutral position thus removing yellow hydraulic pressure from the landing gear and door jacks.

L/GEAR NORMAL LEVER .... DOWN P

Set normal landing gear lever to down.

Setting the normal landing gear lever to DOWN causes the landing gear doors to close.

Reinstatement of the landing gear will cause a transfer of a quantity of fluid between the green and yellow tanks.

END//

(Completely Revised).

LANDING GEAR

REINSTATEMENT OF LANDING GEAR AFTER TEST OF FREE FALL

CAUTION
REINSTATEMENT OF LANDING GEAR AFTER A TEST OF FREE FALL LOWERING CAUSES YELLOW HYDRAULIC TANK LEVEL TO FALL APPROXIMATELY 5 US GALLONS. THIS IS SUFFICIENT TO CAUSE A YELLOW TANK LOW LEVEL BUT IN THIS CASE THE HYDRAULIC TANK LOW LEVEL DRILL NEED NOT BE APPLIED.

L/GEAR NORMAL LEVER .... NEUTRAL P

Verify normal landing gear lever at NEUTRAL.

With the landing gear lever at NEUTRAL the landing gear door selector valves go to their neutral position thus removing green hydraulic pressure from the gear and door jacks. Therefore it is essential during this procedure to verify that the normal landing gear is at NEUTRAL to prevent the landing gear doors closing prematurely.

STANDBY LOWERING LEVER ....NEUTRAL E

With the standby lowering lever at NEUTRAL the landing gear standby selector valve goes to the neutral position, thus removing yellow hydraulic pressure from the landing gear and door jacks.

YELLOW HYD PUMPS .... ON E

Set YELLOW PUMPS selectors to ON.

The YELLOW PUMPS selectors are set to ON because the yellow hydraulics system supplies for gear standby lowering and yellow pumps are not automatically switched on by gear standby lowering selections, and yellow hydraulic system pressure is essential for reinstatement of landing gear uplocks.

(Completely Revised)

L/GEAR FREEFALL MECHANISM .... RESET E

Reset main gear and nose gear EMERGENCY RELEASE OPERATION mechanism, using the removable control lever and knurled knob for the main gear, and hand wheel for the nose gear.

STANDBY LOWERING LEVER ....DOORS FOR 4 SECS THEN WHEELS E

Lift the guard depress handle catch and set standby lowering lever to DOORS.

LANDING GEAR

The standby lowering lever at DOORS reinstates the main and nose door uplock mechanism and lowers the TAIL gear.

Wait four seconds to enable doors to be fully open (thereby preventing door/gear fouling), then, pressing the handle catch and release catch, set lever to WHEELS.

The standby lowering lever at WHEELS reinstates the main and nose gear uplock mechanism.

STANDBY LOWERING LEVER .... NEUTRAL E

Set the standby lowering lever to NEUTRAL and reset guard.

L/GEAR NORMAL LEVER .... DOWN P

Set the normal landing gear lever to DOWN, causing the main and nose gear doors to close.

END//

REINSTATEMENT OF NORMAL SYSTEM AFTER TEST OF STANDBY OR EMERGENCY SYSTEM

YELLOW PUMPS .... ON E

Verify the yellow PUMPS selectors at ON before reinstatement of NOSE AND VISOR to normal system to prevent transfer of green system fluid to yellow tank.

VISOR/NOSE ....CONFIRM POSITION P

Set VISOR/NOSE control lever to correspond with nose position.

EMERGENCY NOSE/VISOR
UPLOCK RELEASE .... NORMAL E

Set the EMERGENCY NOSE/VISOR UPLOCK RELEASE to normal by supporting the weight of the handle and depressing the latch release plunger in the handle pivot allowing the handle to fall to its normal position and engage pip pin.

STBY CONTROL SWITCH .... OFF P

Set NOSE/VISOR standby control switches to OFF by returning the NOSE DOWN and NOSE 5° switches to OFF and the VISOR DOWN switch to OFF and guarded.

During reinstatement the nose will give an upward kick as hydraulic pressure arrives at the nose jacks. This is not harmful.

VISOR/NOSE ....AS REQUIRED P

Set the NOSE and VISOR as required.

END//

USE OF CREW OXYGEN

CREW OXYGEN .... REQUIRED ALL

Remove headset, squeeze the red levers and pull out mask from stowage box.

Don oxygen mask, release red levers.

Releasing the red levers vents the oxygen from the harness.

Adjust the strap for final fitting as necessary

Don headset.

Verify the N-100% switch at 100%

On the associated audio selector panel rotate the BOOM-MASK rotary selector to MASK.

END//

(Completely Revised)

USE OF PASSENGER/CREW OXYGEN INTERCONNECTION

Crew supply pressure gauge pointer not in green arc while in flight.

WHEN CREW OXYGEN REQUIRED

PAX-CREW OXYGEN
INTERCONNECT valve .... INLINE E

Open the upper door of the forward amenity stowage, remove the locking wire then, push and rotate to inline the PAX-CREW OXYGEN INTERCONNECT valve.

WHEN CREW OXYGEN NO LONGER REQUIRED

PAX-CREW OXYGEN
INTERCONNECT valve .... CROSSLINE E

Push and rotate to crossline PAX-CREW OXYGEN INTERCONNECT valve.

END//

(Completely Revised)

WINDSHIELD WIPERS AND RAIN REPELLENT

W/S WIPERS .... ON CP

Rotate the W/S WIPERS rotary selector to SLOW or FAST as required

If the windshield wipers do not operate, the nose must be lowered to fully down before rain repellent is used in order to achieve affective rain clearing flow across the windshield.

At 200 kt, in moderate or heavy rain, wipers alone are not effective.

If taking off into moderate or heavy rain apply repellent (two applications) before take-off run commences. Repellent alone is effective above 50 kt, therefore the wipers should be switched off as soon as possible above this speed as their use degrades the effectiveness of the repellent.

CAUTION

IF, FOR ANY REASON, RAIN REPELLENT FLUID IS APPLIED TO A DRY WINDSHIELD THE FLUID WILL DRY ON A SMALL AREA AND WILL DEGRADE VISIBILITY.

IF RAIN REPELLENT REQUIRED

RAIN REPEL pb .... PRESS AND RELEASE P

Press and release RAIN REPEL push button as necessary to obtain full coverage.

WHEN THE WINDSHIELD WIPERS ARE NO LONGER REQUIRED

W/S WIPERS rty sel ....OFF CP

Rotate the W/S WIPERS rotary selector to OFF
Observe windshield wipers park below the red marks on the inside surface of the forward screen adjacent to the centre pillar.

IF WINDSHIELD WIPER WILL NOT PARK

W/S WIPERS rty sel .... EMERG PARK CP

contd.

CAUTION

IF THE WINDSCREEN WIPER BLADE CANNOT BE PARKED BELOW THE RED SCREEN MARKS USING EITHER THE NORMAL OR EMERGENCY PARKING SYSTEM THE WIPER O/RIDE SWITCH MUST NOT BE USED TO BYPASS THE INHIBITION OF VISOR RAISING.

END//

FIRST ISSUE

ENGINE ANTI-ICING

- Engine anti-icing should be turned on during all ground or flight operations when icing conditions exist and for take-off if ambient temperature is below + 3°C and visibility is less than 1000 metres.

ENGINE ANTI-ICING .... ON E

Verify ENGINE ANTI-ICING switches at ON and observe IGV PRESS lights

The IGV light(s) may not come on until N2 is greater than 70%.

IF IGV PRESS LTS DO NOT COME ON
APPLY PROCEDURE: ENGINE ANTI-ICING MALFUNCTION

ICE AND RAIN PROTECTION

ICE WARNING RECEIVED IN FLIGHT OR, KNOWN ICING CONDITIONS EXISTING.

CAUTION
IF THE VISOR IS DOWN DURING ICING CONDITIONS IT IS RECOMMENDED THAT IT BE LEFT DOWN DURING THE REMAINDER OF THE FLIGHT UNLESS IT IS CERTAIN THAT ALL THE ICE IN THE VISOR/WINDSHIELD INTERFACE HAS BEEN CLEARED.

WING & INTAKE
ANTI-ICING rty sel .... **4 SECS ON** E

Set the WING & INTAKE ANTI-ICING, MAIN OR ALTERN rotary selector to 4 SECS ON
Observe INT lights off, CYCLIC lights off

If the wing and intake anti-icing system is switched on with total air temperature above + 15°C, or with the aircraft on the ground, the CYCLIC and INT lights will come on

If the aircraft lands with the wing and intake anti-icing system switched on the CYCLIC and INT lights will come on

ENGINE ANTI-ICING sws .... ALL ON E

Set the ENGINE ANTI-ICING switches ON and observe IGV PRESS lights on, ICE light off

IF THE VISOR IS UP

VISOR DE-ICE sws .... ON P

(Unchanged)

Set the VISOR DE-ICE switches ON and observe O/HEAT lights off

If possible, verify that the visor is up when in icing conditions

IF O/HEAT LTS ON
Observe O/HEAT lights on and off for short periods

IF THE VISOR IS DOWN

W/SHIELD DE-ICE sels .... HIGH P

Set the W/SHIELD DE-ICE selectors to HIGH and observe clear vision is maintained

contd.

PRINTE
NGLAND

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At HIGH the windshield panels are heated by high voltage and automatically maintained at working temperature

With a W/SHIELD DE-ICE selector at HIGH, the associated windshield de-icing system will automatically change to low condition if the visor is raised or the aircraft is on the ground

IF CLEAR VISION NOT MAINTAINED
APPLY PROCEDURE: WINDSHIELD EMERGENCY DE-ICING

AIRPLANE GENERAL

USE OF JP4 TYPE FUEL

INTRODUCTION

This procedure is applicable whenever the aircraft is to be operated using fuel to the following specifications.

Grade (Type)	Specification
Wide-cut Type (AVTAG: JP 4)	D.Eng. R.D. 2486 Issue 8 Amendment 1 AIR 3407/B Issue 3 ASTM D1655-74 Jet B MIL-T-5624J JP4 Grade I.A.T.A. (Nov. 1974) JP 4 Type 3-GP-22h D.Eng. R.D. 2454 Issue 3 Amendment 1

DISPATCH DEVIATIONS

Until the investigation into the use of this procedure in combination with other procedures are completed the use of this procedure with the following procedures is not authorized.

(a) Configuration Deviation List
(b) Dispatch with One Reheat System inoperative
(c) Dispatch with One Secondary Nozzle inoperative
(d) Dispatch with Both Autothrottles inoperative
(e) Dispatch with Two Wheelbrakes or Two Anti-skid units inoperative
(f) Dispatch with One Green Hydraulic Pump inoperative
(g) Dispatch with One or more Secondary Air Door systems inoperative
(h) Three engine Ferry
(i) Flight with Landing Gear extended
(j) Dispatch without Nose or Main Gear Water Anti-ingestion devices
(k) Operation from Precipitation covered runways
(l) Crew Training (including C of A renewal)
(m) Continuous operation of Anti-icing system
(n) Unreheated Take-Off

LIMITATIONS

The use of Contingency Rating is prohibited. The manual and automatic Contingency Rating selection systems must be inhibited in accordance with the procedure defined in the Maintenance Manual, 12-11-28, "Refuelling with Wide-Cut Fuel".

(Completely Revised)

AIRPLANE GENERAL

USE OF JP 4 TYPE FUEL

Fuel Temperatures

The following fuel temperature limits, as indicated on the engine secondary instrument panel, must be observed.

(a) Minimum Fuel Temperature for starting and relighting = -40°C.
(b) Minimum fuel temperature before advancing the throttle above Idle = -40°C.
(c) Maximum fuel temperature prior to take-off = 35°C.
(d) Maximum continuous fuel temperature = 50°C.
(e) Absolute maximum fuel temperature = 75°C.

Fuel Specifications

Only fuel to the specifications listed in the introduction to this procedure are approved for use, when the following limitations must be observed.

(a) Fuel specifications D.Eng R.D. 2454 and MIL-T-5624J, already include corrosion inhibitor HITEC E515 and anti-icing additive to specification D.Eng. R.D. 2451 issue 2 or MIL-I-27686E. When using these fuels the limitations defined for Kerosine type fuels containing HITEC E515 are also to be observed.

(b) The use of anti-icing additives to D.Eng. R.D. 2451 issue 2, AIR 3562/A or MIL-I-27686E is mandatory in fuels which do not include an anti-icing constituent in the basic fuel.

(c) Shell ASA-3 static dissipator must be present in the fuel at concentrations which result in the electrical conductivity of the fuel remaining within the specification limits, up to a maximum concentration of 1.0 mg/litre (0.35 lbs per 35,000 imperial gallons).

(d) The only optional additives that may be used are those approved for use with Kerosine fuels.

(e) Fuels which deviate from the approved specifications in aromatic content to 25% by volume maximum and smoke point 18 mm minimum, or fuels to specification ASTM ES2-74 Jet B may be used on an exception basis observing the limitations specified for similar deviations from Kerosine fuel specifications, i.e. the minimum fuel temperature limitation specified at Vol.II.01.06.01 para 2.

(f) On completion of a flight using Wide-cut fuel the aircraft fuel tanks must be drained of residual fuel, in accordance with the Complete Defuelling procedures defined in the Maintenance Manual, before refuelling with Kerosine type fuel.

(Completely Revised)

AIRPLANE GENERAL

USE OF JP 4 TYPE FUEL

Fuel Specifications (continued)

If this requirement is not observed, the limitations associated with the use of Wide-cut fuels must be applied to subsequent flights, using a mixture of Wide-cut and Kerosine type fuels.

Flight Envelope

(a) The aircraft is limited to subsonic flight within the approved flight envelope, subject to a maximum altitude of 36,000 ft.

(b) Supersonic operation and continuous operation with a Total Temperature greater than 15°C is prohibited. In order to allow for changes in atmosphere conditions, operation with a Total Temperature greater than 15°C is permitted for a maximum time of 15 minutes per flight.

AIRCRAFT HANDLING

There are no handling difficulties.

PERFORMANCE

Due account must be taken of reduction in performance with use of JP4 type fuel. (See Performance Manual. Section 5).

(Completely Revised)

AIRPLANE GENERAL

USE OF JP 4 FUEL

ALTERATIONS TO NORMAL PROCEDURES DURING USE OF JP 4 TYPE FUEL

PRELIMINARY COCKPIT CHECKLIST

New Item — CONTINGENCY .... CHECK INHIBITION

Observe that the CONTINGENCY INHIBITED locking device has been fitted and that the selectors cannot be moved to the CTY position.

Set REHEAT sels to RHT
Push to ARM, T/O MONITOR pb
Observe CTY lt off

The CTY light remaining off indicates that the automatic selection of contingency rating has been rendered inoperative.

Pull to INHIB, T/O MONITOR pb
Set REHEAT sel to OFF

FLIGHT ENGINEER'S COCKPIT PREPARATION

IGNITION .... BOTH

Set IGNITION rty sel to BOTH to minimize the possibility of a false start.

FUEL HEATERS .... OFF

Set FUEL HEATERS sels to OFF

The use of the FUEL HEATERS is prohibited except under certain conditions in flight as defined in the Procedure FUEL FILTER LIGHT ON during use of JP4 type fuel.

ENGINE INSTRUMENTS .... CHECK

Check serviceability of FUEL TEMP instruments
Only one FUEL TEMP instrument may be unserviceable for despatch with JP 4 type fuel.

AFTER START CHECK LIST

New Item — ENGINE RECIRCULATION VALVES .... OPEN ... E

Set ENGINE RECIRCULATION VALVES sws to OPEN

The ENGINE RECIRCULATION VALVES are set to OPEN for all engine ground operation to prevent the fuel temperature limitations being infringed.

USE OF JP 4 FUEL

BEFORE TAKE-OFF CHECK LIST

New Item

FUEL TEMPERATURE .... MAXIMUM 35°C... E

Check FUEL TEMP on engine secondary instrument panel

The check of the fuel temperature must be carried out before closing the RECIRCULATION VALVES and at least ten minutes after the engine has reached idling conditions.
During this ten minute period it is permissible to operate the engines transiently above idle in order to start the aircraft moving.

CAUTION

If the FUEL TEMP of any engine is greater than 35°C take-off is not permitted due to the possibility of infringing the fuel temperature limitations in flight.

ENGINE RECIRCULATION VALVES .... SHUT .. E

Set ENGINE RECIRCULATION VALVES sws to SHUT

IN FLIGHT

FUEL
Throughout the flight the collector tanks should be kept as full as is practicable in order to keep the engine FUEL TEMP as low as possible.
If at any time the FUEL TEMP reaches 50°C refer to the Procedure FUEL TEMP EXCEEDS 50°C.
If crossfeeding is required refer to the Procedure CROSSFEEDING during use of JP4 type fuel.

Where possible throughout the flight the aircraft speed and altitude should be adjusted to maintain an engine FUEL flowrate greater than 2500 kg/hr.
In the event of the FUEL flowrate falling below 2500 kg/hr the ENGINE RECIRCULATION VALVE for the associated engine is to be selected OPEN.
If other considerations require ENGINE RECIRCULATION VALVES to be selected SHUT, the SHUT selection is to take priority.

AIRPLANE GENERAL

USE OF JP 4 FUEL

AIR CONDITIONING
Whenever the TOTAL TEMP is greater than 25°C normal operation of the air conditioning system is permitted. However in order to minimize the engine FUEL TEMP whenever the engines are operating with a TOTAL TEMP less than 25°C the FUEL VALVES are to be selected SHUT

AFTER LANDING CHECKLIST

New Item ENGINE RECIRCULATION VALVES ....OPEN .... E

Set ENGINE RECIRCULATION VALVES sws to OPEN

USE OF JP4 TYPE FUEL

FUEL TEMP EXCEEDS 50°C

ENGINE FUEL HEATER	OFF	E
ENGINE RECIRCULATION VALVE	OPEN	E
AUTO IGNITION	OFF	E
THROTTLE	ADVANCE IF POSSIBLE	E
ENGINE FUEL TEMPERATURE	MONITOR	E

IF FUEL TEMP REDUCES OR REMAINS CONSTANT AT LESS THAN 75°C
CONTINUE NORMAL FLIGHT

IF FUEL TEMPERATURE GREATER THAN 75°C
APPLY PROCEDURE: PRECAUTIONARY ENGINE SHUT DOWN

FUEL FILTER LIGHT ON

CAUTION
WITH THE FUEL FILTER LIGHT ON A LOSS OF ENGINE POWER MAY OCCUR

ENGINE FUEL TEMPERATURE	OBSERVE	E

IF ENGINE FUEL TEMPERATURE ABOVE + 50°C
APPLY PROCEDURE: FUEL TEMP EXCEEDS 50°C

IF ENGINE FUEL TEMPERATURE BETWEEN + 40°C AND + 50°C

ENGINE RECIRCULATION VALVE	SHUT	E

IF ENGINE FUEL TEMPERATURE IS BELOW + 40°C

FUEL HEATER	ON	E
ENGINE RECIRCULATION VALVE	SHUT	E

WHEN ENGINE FUEL TEMPERATURE ABOVE + 40°C

FUEL HEATER	OFF	E
ENGINE FUEL TEMPERATURE	MONITOR	E

MISCELLANEOUS

USE OF JP4 TYPE FUEL

FUEL TEMP EXCEEDS 50°C

ENGINE FUEL HEATER .... OFF E

Set associated FUEL HEATERS selector to OFF, since in the event of the high temperature in the fuel system being caused by an inadvertent operation of the fuel heater, setting the FUEL HEATERS selector to OFF should reduce the fuel temperature immediately.

ENGINE RECIRCULATION VALVE .... OPEN E

Set associated ENGINE RECIRCULATION VALVES switch to OPEN.

If the high fuel temperature is caused by a malfunction other than a fuel heater failure, the opening of the recirculation valve is one of the means of attempting to keep the temperature within limits.

AUTO IGNITION .... OFF E

Set AUTO IGNITION switch for associated engine to OFF

Fuel temperature in excess of 50°C may cause fuel pump cavitation resulting in a loss of engine power or even flame out. The AUTO IGNITION system is switched off under these conditions since the system could aggrevate engine power loss and flame out situation caused by fuel starvation.

THROTTLE .... ADVANCE IF POSSIBLE E

Advance throttle lever of associated engine in an attempt to lower the fuel temperature by increasing the fuel flow to the engine.

To minimize the FUEL TEMP, the associated engine should be operated at the maximum power consistent with other engine limitations and overall aircraft operational requirements.

ENGINE FUEL TEMPERATURE .... MONITOR E

Monitor FUEL TEMP instrument reading on secondary instrument panel

▶ IF ENGINE FUEL TEMP REDUCES OR REMAINS CONSTANT AT LESS THAN 75°C
CONTINUE NORMAL FLIGHT

▶ IF ENGINE FUEL TEMP GREATER THAN 75°C
APPLY PROCEDURE: PRECAUTIONARY ENGINE SHUT DOWN

USE OF JP4 TYPE FUEL

FUEL FILTER LIGHT ON

CAUTION
WITH THE FUEL FILTER LIGHT ON A LOSS OF ENGINE POWER MAY OCCUR.

ENGINE FUEL TEMPERATURE .... OBSERVE E

Observe FUEL TEMP instrument reading of affected engine on secondary instrument panel

▶ IF ENGINE FUEL TEMPERATURE ABOVE + 50°C
APPLY PROCEDURE: FUEL TEMP EXCEEDS 50°C

▶ IF ENGINE FUEL TEMPERATURE BETWEEN + 40° and + 50°C
ENGINE RECIRCULATION VALVE .... SHUT E

Verify associated ENGINE RECIRCULATION VALVE switch at SHUT to ensure that the possibly restricted flow across the fuel filter is available for engine use.

IF ENGINE FUEL TEMPERATURE IS BELOW + 40°C
FUEL HEATER .... ON E

Set the FUEL HEATER selector to ON since with a fuel temperature of less than plus 40°C in the burner manifold a fuel temperature may exist at the fuel filter, leading to the formation of ice crystals in the fuel, causing clogging of the filter giving rise to high differential pressure.

ENGINE RECIRCULATION VALVE .... SHUT E

Verify associated ENGINE RECIRCULATION VALVE switch at SHUT to ensure that the possibly restricted flow across the fuel filter is available for engine use.

WHEN ENGINE FUEL TEMPERATURE ABOVE + 40°C
FUEL HEATER .... OFF E
ENGINE FUEL TEMPERATURE .... MONITOR E

END//

MISCELLANEOUS

USE OF JP4 TYPE FUEL

CROSSFEED

CAUTION

CROSSFEEDING IS NOT TO BE USED DURING TAKE-OFF OR LANDING.
THE MINIMUM ENGINE FEED PUMPS REQUIREMENT DURING OTHER PHASES OF FLIGHT IS:
- TWO PER ENGINE WITH T/OFF SELECTED,
- THREE PER TWO ENGINES WITH REHEAT ON,
- ONE PER ENGINE DURING CRUISE ABOVE 20,000 FT.
- ONE PER TWO ENGINES DURING CRUISE BELOW 20,000 FT.

DO NOT FEED MORE THAN TWO ENGINES FROM A SINGLE TANK.

This requirement must be taken in account in the event of the need to carry out the Emergency Drills for Failure of Four Main Generators or Electrical Smoke or Fire.

CROSSFEED .... AS REQUIRED E

Verify ENGINE FEED PUMPS switches of the collector tank in use to ON.
Rotate the CROSSFEED rotary selectors of the collector tank in use and the engines to be supplied to inline and observe crossfeed MIs in line.
Set the ENGINE FEED PUMPS switches of the unused collector tank to OFF.

WHEN CROSSFEED NO LONGER REQUIRED

ENGINE FEED PUMPS .... ALL ON E

Set all ENGINE FEED PUMPS switches to ON

CROSSFEED rty sels .... CROSSLINE E

Rotate CROSSFEED rotary selectors crossline ~~and~~ observe CROSSFEED MIs show crossline.

END//

MISCELLANEOUS

USE OF JP4 TYPE FUEL

FALSE START

The FALSE START procedure may only be applied after 2 min has elapsed since previous operation of air turbine starter.

COND VALVE .... OFF E

Verify COND VALVE selector at OFF and observe COND VALVE MI shows crossline.

HP VALVE .... SHUT E

Verify HP VALVE switch at SHUT to prevent flooding the engine with fuel.

IGNITION rty sel .... BOTH E

Verify IGNITION rotary selector at BOTH

ENGINE DEBOW sw .... DEBOW E

Set ENGINE DEBOW switch to DEBOW and observe DEBOW switch light on.

START/RELIGHT sel .... START E

Set START/RELIGHT selector to START

Start clock

Observe START/RELIGHT selector is latched at START, START VALVE MI reads OPEN, ENGINE DEBOW switch light off, START PUMP light (yellow) on, N2 rises.

During the dry motoring cycle the air supply to the ram air turbine starter must be controlled to maintain N2 below 16% and duct pressure below 35 psig to prevent air turbine starter limitations being exceeded.

30 SEC AFTER START/RELIGHT SELECTOR AT START

START/RELIGHT sel .... OFF E

Set START/RELIGHT selector to OFF

OBSERVE AIR STARTER COOLING LIMITATION THEN

START/RELIGHT sel .... START E

Set START/RELIGHT selector to START

Start clock

MISCELLANEOUS

USE OF JP4 TYPE FUEL

Observe START/RELIGHT selector is latched at START, START VALVE MI reads OPEN, ENGINE DEBOW switch light off, START PUMP light (yellow) on, N2 rises.

20 SEC AFTER SETTING START/RELIGHT SEL TO START

HP VALVE .... OPEN E

Set HP VALVE switch to OPEN and observe RH IGN and LH IGN lights (green) on, EGT rising.

IF EGT NOT RISING WITHIN 8 SEC OF OPENING HP VALVE

HP VALVE .... SHUT E
START/RELIGHT sel .... OFF E
ENGINE DEBOW sw .... NORMAL E

Set HP VALVE switch to SHUT, START/RELIGHT selector to OFF and ENGINE DEBOW switch to NORMAL.

END//

IF EGT RISING

Continue as if normal engine start.

END//

TAKE-OFF WITHOUT REHEAT

INTRODUCTION

At light weight, take-off is permitted with reheat selected OFF on all engines. For training, unreheated take-offs are more representative of reheated take-offs at normal service weights. In addition, sideline noise is reduced.

DISPATCH DEVIATIONS

Use of this procedure with the following procedures is not authorised.

(a) Configuration Deviation List
(b) Dispatch with One Wheelbrake or One Anti-skid unit inoperative
(c) Dispatch with One Green Hydraulic Pump inoperative
(d) Three engine Ferry
(e) Flight with Landing Gear extended
(f) Dispatch without Nose or Main Gear Water Anti-ingestion devices
(g) Operation from Precipitation covered runways
(h) Continuous operation of Anti-icing system
(i) Use of JP4 type fuel

The above list does not include dispatch with one Reheat Inoperative and dispatch with one or more Secondary Air Doors Systems Failed Shut since all the actions required by these procedures are contained within this procedure.

AIRCRAFT HANDLING

There are no handling difficulties

PERFORMANCE

See Performance Manual section 5 for Performance penalties and procedures.

Deletion.

MISCELLANEOUS

ALTERATIONS TO NORMAL PROCEDURES FOR TAKE-OFF WITHOUT REHEAT

BEFORE START CHECKLIST

Vol.2B,06-08-02 SECONDARY AIR DOORS .... SHUT ... E

Set the SECONDARY AIR DOORS sels to SHUT

NOTE
This is to prevent reverse flow through the engine bay at low speeds with reheat inoperative.

Vol.2B,06-08-04 CLOCK, ENGINE & TLA BUGS .... SET . ALL

Set the P7 bug to the required value
Set the Fuel Flowmeter bug to zero
Set the throttle angles indices to the required value.

NOTE
Setting the Fuel Flowmeter bugs to zero allows the green clear to go lights to operate normally.

BEFORE TAKE-OFF CHECKLIST

VOL.2B,06-13-02 REHEAT .... OFF ... E

Confirm the REHEAT sels are at OFF.

NOTE
The performance is based on the assumption that in the event of engine failure neither reheat nor contingency ratings are selected. Such selections are however, not prohibited in the event of engine failures.

AT M=0.7 CLIMB CHECKLIST

Vol.2B,06-15-03 SECONDARY AIR DOORS .... AUTO/OPEN ... E

Set the SECONDARY AIR DOORS sels to AUTO when speed greater than 250 kts.
Observe the SECONDARY AIR DOORS MI's read OPEN

AIDS LIMIT LIGHT ON or DATA RECALL REQUIRED PVS 1580 ONLY

●▶ LIMIT LIGHT ON

LIMIT LIGHT........................PRESS & RELEASE.........E

The LH display will show the 4-digit parameter code. The RH display will show the highest recorded value of that parameter, in engineering units.

Repeat the above action until the Limit Light extinguishes, noting parameter code and value in each case.
Parameter codes are listed below.

END//

●▶ DATA RECALL REQUIRED

Maximum positive and negative vertical 'g' in flight, maximum positive and negative vertical 'g' on landing, maximum brake application speed, are all available on recall, to enable the requirement for turbulence/ heavy landing checks to be assessed and to facilitate brake energy calculations after abandoned take-off.

PARAMETER CODE...................INSERT.................E

Parameter codes are listed below

DISPLAY KEY......................PRESS..................E

The LH display will show the 4-digit parameter code. The RH display will show the highest recorded value of that parameter, in engineering units.

NOTE

In order to erase this data before the next take-off, the CLEAR MEMORY key must be pressed whilst the DOORS MWS is on. i.e. door or hatch open.

END//

PARAMETER CODE	PARAMETER
2010	No. 1 N_2
2020	No. 2 N_2
2030	No. 3 N_2
2040	No. 4 N_2
2011	No. 1 N_1
2021	No. 2 N_1
2031	No. 3 N_1
2041	No. 4 N_1
2012	No. 1 EGT
2022	No. 2 EGT
2032	No. 3 EGT
2042	No. 4 EGT
2003	max + 'g' in flight
2004	max - 'g' in flight
2005	max + 'g' landing
2006	max - 'g' landing
2007	max brake application speed

TRANSIT HANDLING GUIDANCE

Occasions will arise when Concorde will transit off-line stations. These notes do not constitute a complete schedule of activities but are produced to highlight particular aspects of Concorde that may be different to other aircraft:

Prior to Arrival at Unscheduled/Off-line Stations

Call ahead on a company frequency when available (see Nav. Manual 3-10-13) or telephone before initial departure e.g. New York to Gander giving a selection of the following details as considered appropriate:-

GROUND EQUIPMENT REQUIREMENTS

AIR START UNIT - with 3 ins quick release coupling to MS33740.

PRE-CONDITIONED AIR UNIT - with 8 in quick release coupling to MS33562.

GROUND POWER UNIT - with 200V 3 PHASE 400 Hz 90 Kva supply.

The ground power socket is located in the lower fuselage right side just forward of nose gear doors 13 ft above ground.

PASSENGER STEPS - for a sill height of approximately 15 ft.

FUEL - estimated volumetric uplift.

There are four couplings of 2.5 in bayonet type to MIL MS29514-29520. Flow rate 540 US gl/min 2046 litre/min per connection. Max pressure 50 psi at aircraft coupling.

ON ARRIVAL

Follow Normal Check lists down to Parking Check List item ground power.
Before accepting a ground power unit of unknown capacity, keep one engine running only and reduce electrical loads by switching off the following items:

THROTTLE MASTERS (non operating engines)................OFF E

Set THROTTLE MASTER selectors for non operating engines to OFF.

FLIGHT CONTROL INVERTERS ....PWR OFF P

Move the guard and set BLUE INVERTER sel to PWR OFF. Observe FAIL lt (red) on. Move the guard and set GREEN INVERTER sel to PWR OFF. Observe FAIL lt (red) on.

MISCELLANEOUS

TRANSIT HANDLING GUIDANCE

TRANSPARENCY DE-ICE DEMIST ....OFF C

Verify WINDSHIELD DE-ICE sels at OFF
Verify VISOR DE-ICE sws at OFF
Verify DV DEMIST sws at OFF

RADAR ....OFF E

On both radar screens
Set IND OFF-LEFT-AHEAD-RIGHT rty sel to OFF

Press OFF pb lt on radar controller
Observe OFF pb lt (white) on

HF RADIOS ....OFF P

Set HF 1 and HF 2 sels to OFF

AIR DATA COMPUTERS ....OFF E

Set ADC1 and ADC2 sws to OFF
Observe flags visible on associated instruments

NOTE

When the ADCs are switched off the secondary nozzle buckets of the operating engine will move to 0° due to the loss of ADC signal to the NASU.

INS ....OFF E

Set INS 1, INS 2 and INS 3 mode sels to OFF

BRAKE FANS ....AS REQUIRED E

Set BRAKE FANS sw to OFF if temp less than 250°C and falling

ENGINE VIBRATION SUPPLY ....OFF E

Set the ENGINE VIBRATION SUPPLY sel to OFF.

FUEL PUMPS ....ALL OFF E

Verify Tanks 5A, 5, 6, 9, 10, 11, 7A, 7, 8 PUMPS sws and sels at OFF
Set ENGINE FEED PUMPS sws (12) to OFF

WATER HEATERS ....OFF E

Set WATER HTRS sw to OFF

MISCELLANEOUS

TRANSIT HANDLING GUIDANCE

GALLEY POWER ....OFF E

Set GEN 1 & 3 and GEN 2 & 4 GALLEYS sws to OFF

AICU SUPPLY CBs ....TRIP E

Trip the circuit breakers for AICUs

CIRCUIT BREAKER	PANEL	GRID REF
AICU 1B SUP	14-216	A 5
AICU 4A SUP	14-216	B 5
AICU 2A SUP	13-216	A 3
AICU 3B SUP	13-216	B 3
AICU 4B SUP	2-213	B14
AICU 1A SUP	2-213	D14
AICU 3A SUP	2-213	H13
AICU 2B SUP	2-213	H14

FWD SUPPLY FANS...OFF E

Set ONLY the equipment bay cooling FWD SUPPLY fan sel to OFF

GROUND POWER ....ON E

Observe GRND POWER AVAILABLE lt (white) on

Set ground power sw to CLOSE and release and live generator sel to OFF

IF... Ground power rejected
Set the equipment bay cooling FWD EXTRACT FAN 2 sel to OFF and the REAR EXTRACT LH fan sw to OFF.

Re-establish ground power

IF... Ground power still rejected
Set all equipment bay cooling fans sels and sws to OFF

Re-establish ground power

When ground power stable
Set equipment bay cooling FWD EXTRACT FAN 2 sel to ON
When ground power stable
Set REAR EXTRACT LH fan sw to ON

PARKING AND STOPOVER CHECKLISTS .... COMPLETE ALL

MISCELLANEOUS

TRANSIT HANDLING GUIDANCE

ENGINE START WITH SUSPECT GROUND POWER

This procedure is only for use on those occasions during transit, when ground power was suspect before engine shut down. Do not carry out panel scans or use the normal checklists. Leave all items in position set at time of shut down, and use the following procedure to start the first engine.

BRAKES ....PARK/CHECKED P.E.

Verify brake control lever at PARK and observe dual BRAKES pressure gauge reads full scale and BRAKES EMERG lt (amber) on

THROTTLES ....IDLE E

Verify throttles at idle.

THROTTLE MASTER No 3 ....ON E

Set No 3 THROTTLE MASTER sel to MAIN or ALTERN

IGNITION sel ....BOTH E

Set the ignition rty sel to BOTH

GROUND HYD CHECK OUT ....YELLOW YELLOW/OFF E

Verify the GROUND HYD CHECKOUT rty sel at YELLOW YELLOW
Verify PUMP 1 G-Y and PUMP 2 B-Y sws at OFF.

BATTERIES ....ON E

Set battery sels (2) to BATT ON.

Observe BATT A and BATT B MIs show inline, BATT ISOLATE lts off and LH and RH ESS/MAIN SPLIT MIs show inline.

NOTE
BATT ON is selected to prevent any interruption of the d.c. supply during engine start.

ENGINE No 3 INSTRUMENT C/Bs ....SET E

CAUTION
DO NOT RESET THE AICU SUPPLY C/Bs.

Reset ONLY the white C/Bs in table.

MISCELLANEOUS

TRANSIT HANDLING GUIDANCE

CIRCUIT BREAKER	PANEL	GRID REF
ENG INST BUS 5XS	2-213	H 4
ENG INST BUS 7XS	4-213	G 2
ENG & FUEL INST BUS 3XS	13-216	G 3

No 3 ENGINE ....START E

Start No 3 engine

No 3 GEN ....ON LINE E

Set No 3 generator selector to ON
Observe No 3 GCB shows inline

ANTI-COLLISION LIGHTS .... ON E

Set ANTI-COLN sw to ON.

ENGINE FEED PUMPS ....ON E

Set No 3 ENGINE FEED PUMP sws to ON and the ENGINE FEED PUMP sw as appropriate for continuation of engine starting sequence

BLEED VALVE ....OPEN E

Set No 3 engine BLEED VALVES sw to OPEN
Observe pressure gauge indicator approximately 20 psi

CROSSBLEED VALVES ....OPEN E

Set No 3 and 4 CROSS BLEED VALVES sws to OPEN

COND VALVES 3 AND 4 .... ON E

Set No 3 and 4 COND VALVE sels to ON
Observe M1 in line within 30 secs and mass flow satisfactory

EQUIPMENT BAY COOLING PANEL ....SET E

Observe FLOW lts are off.
Verify Fan 2 sel and Fans 1 and 3 sel at AUTO.
Observe Forward Extract M1 reads ON.

Verify Forward Supply Fans sel at NORM.
Observe LH and RH Supply Fan MIs read ON.

Verify Rear Extract LH and RH Fans sws at ON and Standby Fan sw at OFF.
Observe LH and RH Rear Extract Fan MIs read ON.

Verify Forward Emergency Relief Valve at SHUT and MI reads SHUT.
Observe Forward Flow Indicator reads 0.85 to 1.1 kgs/sec.
Observe Hydraulic Bay Fan MI reads ON.

CIRCUIT BREAKERS ....SET E

Set all flight deck C/Bs unless collared

PRE FLIGHT CHECKS ....PERFORM ALL

Carry out pre flight checks including panel scans from COCKPIT PRELIMINARY PREPARATION onwards.

NOTE

The INSs will take approximately 15 minutes to count down to status 5, therefore it is recommended that on completion of scan checks, No.2 engine be started in order to give complete crossbleed capability. The remaining 2 engines will be started after selection of INSs to NAV using normal procedures.

LIST OF CONTENTS

MANUFACTURER'S MINIMUM EQUIPMENT LIST

Introduction 05.01.01

Air Conditioning 05.02.01
Automatic Flight 05.02.05
Communications 05.02.07
Electrical Generation 05.02.08
Equipment Furnishing 05.02.09
Fire Protection 05.02.10
Flight Controls 05.02.11
Fuel 05.02.14
Hydraulic Generation 05.02.22
Ice and Rain 05.02.24
Instruments 05.02.26
Landing Gear and Brakes 05.02.27
Lights 05.02.30
Navigation 05.02.31
Oxygen 05.02.36
Ram Air Turbine 05.02.37
Doors 05.02.38
Intake Control 05.02.39
Fuel and Engine Controls 05.02.41
Ignition 05.02.42
Air 05.02.43
Engine Control 05.02.44
Indication Engine 05.02.45
Exhaust & Reheat 05.02.46
Oil 05.02.47
Starting 05.02.48

Despatch Deviation Procedures 05.03.01 onwards

INTRODUCTION

The applicable operational rules permit the publication of a MANUFACTURERS MINIMUM EQUIPMENT LIST (M.M.E.L.) designed to provide operators with the authority to operate an aeroplane with certain items or components inoperative provided an acceptable level of safety is maintained by appropriate operating limitations, by a transfer of the function to another serviceable component or by reference to other instruments or components providing the required information.

For the sake of brevity, the M.M.E.L. does not include obviously required items such as wings, rudders, engines, landing gear, etc. Also, the list does not include items which do not affect the airworthiness of the aircraft such as galley equipment, entertainment systems, passenger convenience items etc. However, it is important to note that ALL ITEMS WHICH ARE RELATED TO THE AIRWORTHINESS OF THE AIRCRAFT AND NOT INCLUDED ON THE LIST ARE AUTOMATICALLY REQUIRED TO BE OPERATIVE.

This M.M.E.L. does not define "where and when" an inoperative item is to be repaired or replaced but rather indicates through approval of minimum equipment lists those instruments and items of equipment that may be inoperative for certain flight conditions with the intent that no flight can take off from an airport with inoperative equipment other than that specified. However, unless otherwise stated, repairs must be made on return to the main base or as soon as possible. The failure of instruments or items of equipment in excess of those allowed to be inoperative by the M.M.E.L. causes the aircraft to be unairworthy.

The operator is responsible for exercising the necessary operational control to assure that no aircraft is despatched with multiple items inoperative without first determining that any interface or inter-relationship between inoperative systems or components will not result in a degradation in the level of safety and/or an undue increase in crew workload.

The exposure to additional failures during continued operation with inoperative systems or components must also be considered in determining that an acceptable level of safety is being maintained. It should be noted that the M.M.E.L. is not intended to provide for continued operation of the aircraft for an indefinite period with airworthiness items inoperative.

Unless otherwise stated in the text, this M.M.E.L. is valid for Cat. 1, Cat 2 and Cat 3 landings.

INTRODUCTION

NOTE:

(1) Asterisk (*) requires inoperative unit or components to be placarded in the cockpit.

(2) Double asterisk ** (o) indicates that a special operating procedure must be applied.
Double asterisk ** (m) indicates a maintenance procedure.

These operating or Maintenance actions are detailed in the Dispatch Deviation Procedures, contained in Section 2 at the back of this M.M.E.L.

(3) A dash (-) in Columns 5 or 6 indicates a variable quantity.

(4) Definitions for the purpose of this list:

A. "VMC flight conditions" means atmospheric environment is such as to allow the flight to proceed under the Visual Meteorologic Conditions applicable to the flight.

B. "Icing Condition" means the atmospheric environment is such that ice can form on the aircraft or in the engine.

C. DAY operation is any flight conducted from the point of take-off to landing between 30 minutes before sunrise and 30 minutes after sunset.

D. "Inoperative" means any time a system and/or component malfunctions to the extent that it does not accomplish its intended purpose and/or is not consistently functioning within its designed operating limit(s) or tolerance.

NOTE: ANY ITEM ANNOTATED $\boxed{\text{P}}$ SHALL BE ENTERED IN THE PERFORMANCE A.D.D. FILE (YELLOW) ONLY.
$\boxed{\text{P}}$ ANNOTATION INDICATES ITEMS OF EQUIPMENT WHICH WHEN UNSERVICEABLE, OR MISSING, CARRY A PERFORMANCE PENALTY. CAPTAINS MUST REFER TO THE INSTRUCTIONS IN THE PERFORMANCE MANUAL AND LIAISE WITH THE GROUND ENGINEER TO ENSURE THAT AN ADVISORY SIGNAL IS SENT TO ONWARD FLIGHT PLANNING STATIONS. AT LHR, DETAILS OF ANY OUTSTANDING PERFORMANCE ITEMS MUST BE PASSED TO PRODUCTION ENGINEERING CENTRAL CONTROL, H2 TBA, FOR ONWARD TRANSMISSION TO APPROPRIATE STATIONS.

(Unchanged)

AIR CONDITIONING

ATA 21

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
1	Air Conditioning Group	4	3	3	**(o) Shut down the affected group.
2	Bleed and Pressure - Control Valve	4	2	2	(a) Failed Shut One Valve per side may be failed shut, provided cross bleed Valves to at least one adjacent system can be opened
			2	2	(b) Failed Open **(m) The failed valves must be closed mechanically before engine start.
3	Cross Bleed Valve	4	2	2	Multiple Valve failures are permitted provided that at least one valve per side is closed. If a valve is failed open the associated Air Conditioning Valve should be confirmed closed for engine start.
4	Conditioning Valve	4	3	3	(a) Failed Shut **(o) Shut down the affected group. (b) Failed Open **(o) **(m) Normal operation is permitted if Mass Flow Valve can be opened and closed using the Airconditioning test panel after engine start. If the Mass Flow Valve is unserviceable, the Conditioning Valve must be closed mechanically.
5	Jet Pump	4	0	0	
6	Over Pressure Detection	4	3	3	The affected Bleed and Pressure Control Valve should be switched to SHUT.
7	Pressure Indicator	4	2	2	

(Deletion)

AIR CONDITIONING

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
8	Ram Air Valve	4	2	2	(a) Failed Open Normal operation of group permitted.
			3	3	(b) Failed Shut **(m) **(o) Normal operation permitted if the Ram Air Valve can be opened mechanically. If it cannot be so opened, shut down the group.
9	Fuel Throttle Valve	4	2	2	(a) Failed Open Normal operation permitted.
			3	3	(b) Failed Shut **(m) **(o) Normal operation permitted if the Fuel Throttle Valve can be opened mechanically. If it cannot be so opened, shut down the group.
10	Temperature Control System	4	3	3	**(o) If no control in Auto and Standby, shut down the associated group.
11	Temperature Control Valve Indication	4	2	2	Normal operation permitted provided the associated duct Temperature Indicator is serviceable.
12	Cabin Inlet Safety Valve	4	3	3	**(o) One valve may be failed shut provided that the associated group is shut down.
13	PRIM EXCH. SEC EXCH DUCT warnings	4	3	3	**(o) Shut down the associated group.
14	Cold Air Unit Inlet Indication	4	0	0	
	Duct Temperature Indication.	4	2	2	Normal operation permitted provided the associated T.C.V. position indicators are serviceable

(Unchanged)

AIR CONDITIONING

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT		LIMITATION/PROCEDURE
15	Mass Flow Indication	4	2	2		Normal operation permitted provided all other indications for the associated group are normal.
16	Temperature indication Flight-deck and Cabin.	3	1	1		
17	Cold Air Unit Leak Detection	4	3	3	**(o)	Shut down the associated group.
18	Nac/Wing Overheat Detection	4	3	3		See MEL 26-4.
19	Air Conditioning Smoke Detection	4	3	3		One may have active failure (provided the Rotary Switch is set to INHIBIT) or passive failure (FAULT LIGHT).
20	Cabin Pressure Control System	2	2	2		Both Rear Discharge Valves may be failed shut.
21	Discharge Valve Position Indicator	1	-	-	**(o)	Both Position Indications from one system may be inoperative
22	Cabin Altimeter	2	0	0	**(o)	Differential pressure indicator must be serviceable
23	Differential Pressure	1	0	0	**(o)	One cabin altimeter must be serviceable.
24	Cabin Altitude Rate of Change Indication	1	0	0		One cabin altimeter must be serviceable
25	Thrust Recuperator System	1	0	0		
26	Landing Gear Ventilation Valve	1	0	0		
27	Ground Pressure-Relief Valve	1	0	0		If failed shut, the switch must be selected to either SHUT 1 or SHUT 2 and the valve confirmed closed.
28	Hyd. Bay Vent. fan	1	0	0		Prolonged engine ground running should be avoided.

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
29	Fwd.Chassis Vent. Valve	1	0	0	
30	Fwd. Rack Supply Fans	2	1	1	
31	Fwd. Rack Extract Fans	3	2	2	**(o) **(m)
32	Fwd. Rack FLOW Warning	2	2	2	No concession.
33	Rear Rack Extract Fans	3	2	2	Any one of the three may be U/S
34	Rear Rack FLOW Warning.	1	1	1	No concession
35	Emergency relief valve	1	1	1	No concession
36	Duct Outward Relief Valve	1	1	1	(a) Failed Shut No concession
			0	0	(b) Failed Open May be failed open provided all 3 Forward Extract Fans are serviceable and are selected On for the complete flight.
37	Inward Relief Valve	1	1	1	(a) Failed Shut No Concession
			0	0	(b) Failed Open May be failed open provided all three Fwd. Rack Extract Fans are serviceable and are selected On for the complete flight.
38	Fan Bypass Duct NRV	1	1	1	No Concession
39	Not Used				

(Unchanged)

	REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
	1	Automatic Pilot & Flt Director	2	1	1	(a) Associated Auto Stab must be serviceable. Both longitudinal APs must be in racks and connected when failed. Both APs and one FD required for cat 3 landing.
	2	Instinctive disconnect button.	2	-	-	(a) Both needed for automatic landing. (b) ONE may be inoperative if approach procedures are not based on its use. Coupled approach must be flown by the pilot whose disconnect is serviceable.
				0	0	(c) Normal flight permitted if AP is not used. 'AUTO PILOT' to be placarded 'NOT TO BE USED'.
	3	Autostabilisation				All axes of both systems required for cat 3 landing
		Pitch	2	1	1	**(m) **(o) The stick shaker and the remaining wobbler must be serviceable.
		Roll	2	1	1	
		Yaw	2	1	1	
P	4	Autothrottle	2	1	0	Normal flight permitted with one system U/S. **(O) If both systems U/S subsonic flight only, is permitted provided that a manual landing without Flight director is made.
	5	Electric Trim	2	1	1	
	6	A.F.C.S. Warning and landing display	2	1	1	
P				0	0	Normal flight permitted if AP and AT are placarded 'NOT TO BE USED'. Equipment must be left in rack and connected.

AUTOMATIC FLIGHT

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
7	Inertial system comparator.	1	-	-	Must be serviceable for cat 3 landing. **(o) May be inoperative to return to main base providing: - all attitude sources are serviceable and, - operational procedure is applied - take-off & climb can be made in visible horizon conditions. Aircraft must not depart a station where repair or replacement can be made. Equipment must be left in rack and connected.
8	Altitude Alert Light	2	0	0	
9	Airspeed Discrepancy Light	2	0	0	
10	Flight Director Changeover Switch	2	0	0	
11	I.T.E.M.	2	0	0	Equipment must be left in rack and connected unless Maintenance Procedure applied. **(m)

COMMUNICATIONS

ATA 23

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
1	HF	2	1	1	
2	VHF Comm.	2	2	2	No concession.
3	Selcal	1	0	0	
4	Audio Selector Panel	4	3	3	Captains, First Officers and Flight Engineers panels must be serviceable.
5	Flight Deck interphone (Between crew members)	1	1	1	Must be serviceable for each person on flight deck duty.
6	Service/Cabin interphone cabin/flight deck.	1	0	0	Providing that the public address system is serviceable.
7	Public address system	1	1	1	Providing that megaphones & a cabin interphone system are serviceable.
8	Flight Deck Loud Speakers	2	2	2	Required for Audio-Warning Signalling.
9	Cockpit voice recorder	1	-	-	Must be serviceable ex LHR. May be U/S for a total of 6 consecutive sectors en route provided that the Flight Data Recorder is serviceable.
10	Static dischargers	26	13	13	50% may be missing from right and left wing, rudder and tail cone respectively.
11	Evacuation alert System	1	0	0	Provided public address system is serviceable.

(Unchanged)

ELECTRICAL GENERATION

REF. NO.	NORMAL COMPLEMENT ITEM		REQUIRED FOR SUBSONIC FLIGHT	REQUIRED FOR SUPERSONIC FLIGHT	LIMITATION/PROCEDURE
1	Generation Channel including CSD.	4	3	3	Normal flight permitted with one channel inoperative provided the GCB is open. If the CSD is in any way damaged, disconnect it. In the event of a CSD input shaft oil seal failing, engine oil will appear from the seal interspace overboard drain. To prevent further loss of oil the drain pipe may be blanked in accordance with DDP 24.1 on page 05.03.05.
2	KW/KVAR Meters	4	2	2	Normal flight permitted if BTB can be operated.
3	Emergency Generator	1	1	1	No Concession.
4	A.C. Voltmeter	1	0	0	) Normal flight permitted if
5	Frequency meter	1	0	0	) remainder of generation system
6	D.C. Voltmeter	1	0	0	) is serviceable.
7	CSD Oil Low Pressure Indication	4	3	3	Normal flight permitted providing respective oil temp. ind. and KW/KVAR meter are serviceable.
8	CSD Oil Temp. Indicators	4	3	3	Normal flight permitted providing Low pressure warning is serviceable.
9	Auto Paralleling System	4	3	3	On faulty channel, apply Abnormal Procedure: MANUAL PARALLEL.
10	TRU	4	3	3	1 and 4 must be serviceable.
11	Inverter 26 V 1800Hz	2	2	2	No Concession.
12	1800 Hz Protection System Unit	2	2	2	No Concession.
13	Transformer 26V	2	2	2	No Concession.
14	Batteries	2	2	2	No Concession.
15	Not Used				
16	Not Used				
17	Battery Ammeter	2	1	1	
18	TRU Ammeter	4	3	3	

EQUIPMENT FURNISHING

ATA 25

REF. NO.	NORMAL COMPLEMENT ITEM		REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
1	Seat Belts - Flight Deck				One harness per Crew Member must be available.
2	Seat Belts - Cabin				One Belt for each person on board.
3	Doors - Emergency Exits Escape Slides/Slide Rafts	6	5	5	**(o) **(m) One emergency exit may be inoperative OR one escape slide or slide/raft unserviceable.
4	Crew Seats power actuation	3	0	0	With power failed, the Captain's and E/O's seats must not be moved in flight, except in cruise.
5	Escape Rope (Flight Deck)	2	2	2	No concession
6	Megaphone	2	1	1	Provided public address is serviceable
7	Cabin Crew seats and Harness				Any number may be unserviceable provided: (a) Cabin Crew assigned to affected jump seat occupies a passenger seat as close to, or nearer than the nearest seated passenger to the associated exit and (b) The Passenger Seat to be used by the Cabin Crew is placarded for that purpose.

(Unchanged)

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REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
1	Power Plant fire detection	2	1	1	Normal flight permitted with one loop serviceable (per engine).
2	Power plant combustion chamber flame detection	2	1	1	Normal flight permitted with one system serviceable (per engine)
3	Engine fire extinguishers	4	4	4	No Concession
4	Nac/Wing Overheat (Light On)				**(m) Differentiate between NAC & WING overheat indication.
	Nac Overheat or failure to test	4	0	0	**(m) Inspect engine. If OK, disconnect faulty loop.
	Wing Overheat	4	3	3	**(o) Shut down associated air-conditioning group.
5	Fuel vent protection ignition detector and suppressor.	1	1	1	No Concession
6	Portable extinguishers Cabin/flight Deck				
	For more than 60 pax	5	4	4	1 CO_2 on the flight deck 1 CO_2 in fwd cabin stowage 1 CO_2 in rear cabin stowage 1 other approved extinguisher in the cabin.
	For 31 to 60 pax (inclusive)	5	3	3	1 CO_2 on the flight deck 1 CO_2 in the fwd cabin stowage 1 CO_2 in the rear cabin stowage
	For less than 31	5	2	2	1 CO_2 on the flight deck 1 CO_2 in the fwd cabin stowage
7	Smoke Detection System	10	8	8	Not more than 8 flights permitted with either: **(o) (a) Not more than 2 detectors inoperative, or (b) Persistent false smoke alarm, confirmed by Ground Inspection of affected zone.
8	Fuel leak detection (Dry Bays)	4	4	4	No Concession.

FLIGHT CONTROLS

REF. NO.	NORMAL COMPLEMENT ITEM		REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
1	Electrical Control Mode (Blue or Green)				Normal flight permitted with one of the electrical control modes inoperative on one only of the three following groups of control surfaces:
	- Inner Elevons	2	1	1	The inner elevons
	- Middle-Outer Elevons	2	1	1	OR the middle and outer elevons
	- Rudder	2	1	1	OR the rudder
2	**Artificial Feel**				
	Pitch	2	1	1	**(o) **(m) One Lane may be inoperative provided check is made of serviceability of the Second Lane, the Shaker and the appropriate Wobbler.
	Roll	2	1	1	**(m) One Lane may be inoperative provided serviceability of the second Lane is checked.
	Yaw	2	1	1	**(m) One Lane may be inoperative provided serviceability of the second Lane is checked including check of second threshold
3	**1800 Hz inverter and protection unit.**	2	2	2	No Concession.
4	**Main servo control Hydraulic Selector Unit**				
	(a) Blue LP Warning Lt.	1	1	1	No concession
	(b) Green LP Warning Lt	1	1	1	No concession
	(c) PFC selector pea lights	8	4	4	One light per pair may be U/S
	(d) Blue Jam Warning Lt	1	1	1	No concession
	(e) Green Jam Warning light	1	1	1	No Concession
5	Relay Jack Panel	1	1	1	No Concession
6	**Not used**				

(Unchanged)

FLIGHT CONTROLS

ATA 27

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
7	**Mech Jam Light**	1	-	-	Normal flight is permitted if, - with pitch and roll control runs static, the warning cannot be cancelled or re-appears. - the warning only appears with rapid control movements.
8	Control Position Indicator.				
	(a) Control surface position indicators	8	-	-	**(o) **Normal flight permitted provided a visual check of control surface movement is made prior to take-off** Note: Both Middle surface indicators must be serviceable if one CG indicator is unserviceable for a supersonic flight.
	(b) Control mode MI	8	-	-	**One per pair of control surfaces may be inoperative**
	(c) Warning Lights	8	-	-	**One per pair of control surfaces may be inoperative**
9	**Inner elevon warning light**	1	0	0	**(o) Normal flight is permitted provided that the inner elevons position indicators are serviceable.
10	**Trim Mechanical**	3	3	3	**No concession**
11	**SFC** - Emergency Flight Control	2	1	1	**(o) **(m) The stick shaker and the remaining wobbler must be serviceable.
	SFC - Anti Stall System	2	1	1	**(m) The stick shaker and the **(o) remaining wobbler must be serviceable plus: **(o) for cat 3 landing **(o) for dispatch with SFC computer removed.
12	Stick Shaker	1	1	1	No concession.

TEMPORARY REVISION

Insert facing 05.02. Page 13.

REASON FOR ISSUE:

Pending modification of the nose position transmitter.

ACTION:-

19	Nose Magnetic Indicator	1	0	0	Flight with identified nose position transmitter failures is not permitted.

FLIGHT CONTROLS

REF. NO.		ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
		DROOP NOSE AND VISOR				
P	13	Visor Raising System	1	1	0	For speed limitations see Flying Manual Section 1.
P	14	Nose raise 5° to 0° System	1	1	0	For speed limitations see Flying Manual Section 1.
	15	Standby Lowering System	1	0	0	Provided that there are no known faults in the normal and emergency lowering system.
P	16	Emergency Lowering System	1	1	0	Nose not to be raised to 0° Apply limitations as for Visor Down. See Flying Manual Section 1.
	17	5° locks and indication System.	1	0	0	Speed limitation appropriate to Nose Fully 'DOWN' must be observed when nose is not locked in the 'UP' position. See Flying Manual Section 1.
	18	Visor Magnetic Indicator	1	0	0	Position of visor to be checked visually.
	19	Nose Magnetic Indicator	1	0	0	**(m) Position of nose to be checked visually and validity of signal to nose MI verified. Flight is not permitted if signals cannot be verified.
	20	Green down light	1	0	0	Position of visor and nose to be checked visually.
P	21	Visor uplock and Indication	1	1	0	Limitation: Speed not greater than 325 knots and not greater than M=0.95.

FUEL

	REF. NO.	NORMAL COMPLEMENT ITEM		REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
		ENGINE FEED				
P	1	Collector Tank Pumps	12	11	11	**(o) **(m) For take-off, the same side tank 9 pump must be used in place of the failed pump provided that tank 9 is full. **OR** **if tank 9 is not full, reheat must not be used on affected engine** See Performance Manual Section 5, Dispatch with One Reheat U/S.
	2	Pump Low Pressure Indication (Collector tanks 1 to 4).	12	8	8	Only one pump indication unserviceable per collector tank
	3	Fuel Accumulator, Air Supply Control Unit and Function/Failure Pressure Switch Unit.	4	3	3	
	4	Cross Feed Valves	4	4	4	No Concession
	5	Low Pressure Valves	4	4	4	No Concession
P	6	Fuel Temperature Probes	8	7	0	) Subsonic flight permitted) provided engine fuel temp.) indication is serviceable
P	7	Fuel Temp Indicators	2	2	0	
	8	By-Pass Valve	4	3	3	**(m) Normal flight permitted if defective valve functions satisfactorily in the spring loaded mode.
	9	Fuel/Hydraulic Heat Exchanger	6	5	5	**(m) Normal flight permitted provided defective Heat Exchanger can be identified and its associated Hydraulic Pump depressurised, provided there is no leakage.
	10	Fuel/Air Heat Exchanger	4	3	3	**(m) **(o) Normal flight permitted provided that there is no leakage and that the associated airconditioning group is shut down.

(Unchanged)

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
11	Fuel Control Throttle Valve				See MEL 05.02.02 Item 9.
12	Engine Low Pressure Warning	4	4	4	No Concession
13	Low Pressure Recirculation Valve	4	0	0	Only required for ground running of Air Conditioning.
14	Recirculation Pressure Holding Valve	4	4	4	Failed shut. No concession.
		4	0	0	Failed Open.
14A	Fuel Consumed Indicators	4	2	2	Both Total Contents serviceable.
	MAIN TRANSFER				
15	Pumps (Tanks 5 to 8)	8	6	6	Normal flight permitted with any two unserviceable pumps in different tanks providing. (a) They do not feed the same collector tank. (b) Transfer Valves and Sensors for remaining pumps and interconnect valves are serviceable.
16	5A & 7A Pumps	4	-	-	Normal flight permitted with one pump per tank U/S. **(o) If both pumps in one tank or both pumps in both tanks U/S, apply procedure.
17	Pump pressure indication	10	6	6	Provided there is one serviceable pressure switch in each tank and it is associated with a serviceable pump and tanks 5A/7A pressure switch captions have failed off.
18	Transfer Control Valves	8	6	6	**(o) Normal flight permitted with one unserviceable valve and sensor per side of A/C, provided the pumps for remaining valves of associated tanks are serviceable and not on same busbar.
19	Transfer Shut-off Valves (Tanks 5A and 7A)	2	0	0	**(o) Failed shut. Flight permitted provided tank(s) empty.
		2	0	0	Normal flight permitted provided failed open.
P 20	Tank interconnect Valves (5-8, 6-7)	2	0	0	(a) Subsonic flight permitted with valves failed in any position provided fuel pumps, transfer valves are serviceable in the affected tanks.

(Unchanged)

REF. NO.		NORMAL COMPLEMENT ITEM		REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
	20					(b) Supersonic flight permitted only if valves failed shut, and pumps transfer valves are serviceable in the affected tanks.
	21	Aft Trim Solenoid Valves	4	4	4	Failed closed (at Aft Trim position), no concession.
			4	0	0	Failed open (at Normal position), control 1 and 4 tank levels by selective use of transfer pumps.
		TRIM TRANSFER				
P	22	Pumps Tank 9	2	2	1	Provided associated engine feed pumps are serviceable
					0	Provided mission does not require fuel to be stored in Tank 9.
P	23	Pumps Tank 10	2	2	1	If fuel required in Tank 10, use contents of Tank 10 at beginning of flight.
				0	0	Provided mission does not require fuel to be stored in Tank 10.
P	24	Pumps Tank 11	4	4	2	The Blue Hydraulic Fuel Pump must be serviceable.
P	25	Pump Low Pressure Indication				
		Tanks 9 and 11	6	6	6	No Concession
		Tank 10	2	0	0	**(o) Provided no fuel in Tank 10 and pumps and inlet valves Circuit Breakers tripped.
P	26	Inlet Valves				
		Tank 9	2	2	1	Subsonic Flight permitted provided valve failed shut.
		Tank 11	2	1	1	Flight permitted provided valve failed shut (Reduces Aft Trim Transfer rates)
P	27	Inlet Valves				
		Tanks 5 and 7	2	0	0	Flight permitted provided valves failed shut and refuelling valves of Tanks 5 and 7 are serviceable (Reduces Trim Transfer Rates).

FUEL

	REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
	28	Trim Pipe Drain Valve	2	2	2	Failed open. No concession
			2	0	0	Provided both failed shut.
		JETTISON				
	29	Collector Tanks Jettison Valves	4	4	4	Failed open. No concession
			4	3	3	Provided failed shut.
	30	Master Jettison valves	2	2	2	Failed open. No concession
			2	1	1	Normal flight permitted provided valve failed shut. (Jettison time doubled)
		DE-AERATION				
P	31	Pump Tank 10	1	0	0	Normal flight permitted for:- (a) A maximum of three flights if tank 10 contents is greater than 10,500 kg at an altitude of above 30,000 feet OR (b) Unlimited flights if tank 10 contents less than 10,500 kg above 30,000 feet.
		VENT AND FUEL PRESSURISATION				
	32	Vent Shut-off valves, pressure switches and over pressure switches	2	1	1	Normal flight permitted with valves failed shut provided overflow/relief pressure switches and forward gallery inward relief valves are serviceable.
			2	0	0	**(o) Flight permitted with valves failed open or one failed shut and one failed open and Circuit Breakers tripped.
P	33	Pressure control valve	1	0	0	If the Tank Pressure Warning Light illuminates, apply procedure, TANK PRESS LIGHT ON.
	34	Scavenge pump and Sensor	1	0	0	**(o) Normal flight permitted with Circuit Breaker tripped.

(Unchanged)

FUEL

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
35	Overflow/relief Valve and Sensors.	1	1	1	No concession
36	Tank Pressure sense line drain Valve	1	1	1	Failed open. No concession
		1	0	0	Failed shut.
37	Tank Pressure Indication	1	1	1	No concession
38	Scavenge Non-Return Valve	1	0	0	**(o) Normal flight permitted with non-return Valve failed shut and Scavenge Pump Circuit Breaker tripped.
39	Tank Pressure Relief Valves	16	16	16	No concession.
40	Air no Fuel Valves	30	12	12	Normal flight permitted provided one Valve serviceable per Tank.
41	Thermal expansion Non-Return Valve	2	0	0	Normal flight permitted with Non-Return Valves failed shut and Scavenge system operating.
42	Forward Gallery inward relief Valves	2	1	1	Normal flight permitted provided Valve shut.
43	Vent burst Discs	9	9	9	No concession
	REFUEL/DEFUEL				
44	Refuel Control Unit	2	0	0	Normal flight permitted provided couplings are shut after refuelling
45	Refuel Protection Pressure Switch	2	0	0	
46	Refuelling Valves tanks 5A/7A/9	3	0	0	Normal flight permitted provided all valves are shut after refuelling. **(o) Flight permitted with no fuel in tank 5A and/or 7A **(m) Valves can be shut manually.
47	Refuelling Valves (Tanks 1,2,3,4,5,6,7,8 & 10)	9	7	7	One failed shut per side permitted. **(m) Valves can be shut manually.

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FUEL

ATA 28

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
	F.Q.I. 's				
48	Tank probes	80	-	-	**(o) Normal flight permitted provided: — Only one tank's quantity information or one channel of a trim transfer tank is unserviceable. — The level switching for the defective tank is serviceable. — The defective tank refuel valve shuts satisfactorily and the refueler meter confirms the correct total fuel added. (Use the manual fuel level indicator to confirm the contents of a part full tank with defective quantity information. — The trim transfer system is fully serviceable. — Flight control position indicators for middle elevons are serviceable. — With a single channel tank system unserviceable, all four fuel consumed indicators are serviceable. — Should a tank 9, 10 or 11 FQI be suspect the failed channel must be identified. If identification is not possible from the warning lights the Dispatch Deviation Procedure 28.50 should be used. — Both Pitch Autostabs are serviceable. — And the Dispatch Deviation Procedure - DESPATCH WITH FAILED FUEL GAUGING CHANNEL - is applied.
49	Quantity Packs	2	-	-	
50	Fuel Quantity Indicators	13	-	-	

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
51	Fuel Total Contents	2	0	0	Provided all four fuel consumed indicators are serviceable.
52	Fuel consumed indicators.	4	2	2	Provided both Total Fuel Contents indicators serviceable.
	LEVEL SENSORS				
53	Overfull				
	(a) Tanks 1,2,3,4,	12	12	12	Note: Loss of any overfull or high level indication requires continuous monitoring during refuelling
	(b) Tanks 5,7,	4	4	4	
	(c) Tanks 6,8,	2	0	0	
	(d) Tank 9	2	0	0	
	(e) Tank 10	2	0	0	
	(f) Tank 11	2	2	0	Overfull not required in Tank 11 for Subsonic flight if High Level serviceable.
	(g) Tanks 5A/7A	2	0	0	
54	High Level				
	(a) Tanks 1,2,3,4,	4	4	4	High Level not required in Tank 11 for Subsonic flight if Overfull serviceable.
	(b) Tanks 5,7,	4	4	4	
	(c) Tanks 6,8,	2	0	0	
	(d) Tank 9	2	2	0	
	(e) Tank 10	2	0	0	
	(f) Tank 11	2	2	0	
	(g) Tanks 5A/7A	2	0	0	
55	Underfull, Tanks 1,2,3,4,	4	3	3	Provided main transfer pumps and transfer control valves feeding the affected tank are serviceable.
56	Low Level				
	(a) Tanks 1 and 4	2	2	2	No concessions.
	(b) Tanks 2 and 3	4	4	4	
57	Not used,				

(Unchanged)

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FUEL

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
	CENTRE OF GRAVITY				
58	C.G. Indicators	2	1	1	Provided (a) If Captains C.G. indicator failed, bugs on Captain and Co-Pilot machmeters are serviceable. (b) If Flight Engineers' C.G. indicator failed, bugs on either Captain or Co-Pilot machmeter are serviceable. (c) Flight control position indications for middle elevons must be serviceable.
59	C.G. Computers	3	2	0	(a) Flight control position indications for Middle elevons must be serviceable. **(o) (b) Subsonic flight permitted with 3 C.G. Computers inoperative provided all F.Q.I. indicators are serviceable & zero fuel C.G. is between 52% and 54% (c) Both Pitch Autostabs are serviceable.
60	F.Q.I. Control Panel (a) Numerical Indicator (b) Z.F.W. Setting Knob	1	1	1	Partial system failures are permitted. May be inoperative **(o) May be inoperative provided margin between preset and real Z.F.W. is less than ± 3000 kgs.

(Deletion)

HYDRAULIC GENERATION

REF.	NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
P	1	Hydraulic Pumps	6	5	5	**(o) One pump may be inoperative **(m)
	2	Pump Low Pressure Warnings	6	4	4	Any two from different systems may be U/S provided that the associated pump is checked serviceable.
	3	Manifold Pressure Switch	3	2	2	
	4	Pump MIs	6	0	0	
	5	System Pressure Indicator	3	2	2	Provided the corresponding pump Low Pressure Warnings are serviceable.
	6	Shut-off valve MI	6	0	0	MI may be inoperative provided SOV confirmed open.
	7	Reservoir de-aeration	3	2	2	**(m)
	8	Reservoir Low Level Warning	3	3	3	No Concession
	9	Hydraulic Contents Indicator	3	2	2	**(m) Provided the level is checked at the reservoir and the associated pressure switch (manifold) is serviceable
	10	Reservoir "Low Pressure Indication	3	1	1	**(m) Provided the pressure is checked on gauges at the reservoir.
	11	Reservoir Temperature Indicator	3	0	0	
	12	Overheat Warning	3	2	2	**(o)
	13	Main System Accumulator	3	0	0	
	14	Pump (R.A.T.)	2	2	2	No concession.

(Unchanged)

4 OCT.79

TEMPORARY REVISION
Insert facing 05.02 page 22

REASON FOR ISSUE:

Withdrawal of the concession to dispatch with one blue hydraulic pump unserviceable.

ACTION:

1.	Hydraulic pumps	6	5	5	**(o) Both blue hydraulic **(m) pumps must be serviceable.

HYDRAULIC GENERATION

REF. NO.		NORMAL COMPLEMENT		REQUIRED FOR SUPERSONIC FLIGHT		
		ITEM			REQUIRED FOR SUBSONIC FLIGHT	
						LIMITATION/PROCEDURE
	15	Filters	15	-	-	**(m)
	16	Ground Hydraulic Pumps	2	0	0	
	17	Reservoir Compressor	1	0	0	

(Unchanged)

ICE AND RAIN

REF. NO.		ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
P	1	Wing and intake Anti-icing	2	-	-	If weather forecasts indicate that icing conditions are likely to be met (a) Complete loss of either LH or RH de-icing is not permitted. (b) Not more than 1 cyclic and 1 continuous load per side may be inoperative.
			2	0	0	If weather forecasts indicate that icing conditions are not likely to be met.
	2	ADS Probe/Sensor Heating				
		Pitots 1 and 2	2	2	2	No concession
P		Side slip sensors	2	-	-	) Any one of the 6 heaters may be failed provided weather forecasts indicate that icing conditions are not likely to be met.
		Incidence sensors	2	-	-	)
		Total temperature probes (T_t) (Lower Fuselage)	2	-	-	)
						For failure of incidence sensor heater ensure no possibility of the sensor being frozen during take-off.
P		Static vent heaters	4	2	2	Provided both operative heaters are associated with the same ADC and weather forecasts indicate that icing conditions are not likely to be met.
	3	Engine T_1 Probe Heaters	4	3	3	Provided all 4 engine control units on the same side of the aircraft as the faulty heater are operative.
	4	Standby instruments Pitot Static Heating	1	1	1	No Concession
	5	Forward Windscreen Heating	2	1	1	Provided Emergency Power Supply to screens is available.
	6	Side and DV Window Heating	2	0	0	
	7	Windscreen Wipers	2	1	1	Provided that the rain repellant system of the failed wiper is serviceable.

ICE AND RAIN

REF. NO.	NORMAL COMPLEMENT		REQUIRED FOR SUPERSONIC FLIGHT		
	ITEM			REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
8	Rain Repellent	2	1	1	Providing associated windscreen wiper is serviceable.
9	Ice Detection	2	1	1	
10	Visor Glazing Heating	6	0	0	
11	Water Drain Mast	3	1	1	Wash basin facility must be placarded NOT TO BE USED during subsonic flight.

INSTRUMENTS

ATA 31

REF. NO.		ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
P	1	**Cosmic Radiation Meter**	1	0	0	May be U/S unless a Red or Amber warning is forecast
	2	**Flight Data Recorder system**	1	0	0	The Accident Recorder must be serviceable ex LHR unless unserviceability occurred during or after pre-flight checks, when the aircraft may proceed with the recorder U/S until its return to LHR, provided that the Cockpit Voice Recorder is serviceable. The aircraft may depart from any line station with the Accident Recorder U/S provided that the Cockpit Voice Recorder is serviceable. The Long Term recorder is not mandatory.
	3	Clock	3	1	1	
	4	Master Warning System				See ATA 33

	REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
		LANDING GEAR				
	1	Pitch damper	4	2	2	At least one damper per landing gear must be serviceable.
	2	Downlock indication lights.				
		Main & Nose Gear	3	2	2	One may be U/S provided that the associated optical lock indicator is serviceable.
		Tail Gear	1	0	0	
	3A	Tail Gear Transit Light	1	0	0	
	4	'Short' Light-failure to illuminate	2	0	0	
	5	'Upper Locks' light-failure to illuminate	1	0	0	May be unserviceable provided it is verified that the three gear up-locks are correctly open prior to take-off.
		BRAKES				
P	6	Braking System (a) Brake Units	8	7	7	**(o) **(m) One brake unit may be inoperative provided that it is hydraulically isolated. The remaining 7 brake systems must be fully serviceable. See Performance Manual section 5 for performance penalty.
		(b) Anti-skid Channels ('R' lt continuously on or continuously off).	8	7	7	**(o) **(m) Apply procedure to determine whether indication or system fault
		(c) Overload Channels (Clover leaf indication plus white MI).	8	7	7	**(o) **(m) Apply procedure to determine whether indication or system fault

LANDING GEAR AND BRAKES

	REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
	7	Not used.				
	8	Dual standby pressure indicator	1	1	1	No concession
	9	Brake accumulator pressure indicator	1	0	0	**(m) May be inoperative provided pressure is checked on accumulator gauge
P	10	Brake temperature sensor	8	7	7	** (o) One sensor may be ** (m) inoperative
	11	Brake temperature warning light	8	-	-	One or more may be inoperative if gauge is serviceable and is used to verify temperature of brakes concerned before take-off and gear retraction.
	12	Brake temperature gauge	1	0	0	May be inoperative provided that the eight temperature warning lights are serviceable
	13	Overheat warning	1	0	0	** (o) May be inoperative provided that all brake temperature warning lights are operative
P	14	Brake fan	8	-	-	* (o) * (m)
	15	Emergency Brake Warning Light	1	0	0	May be inoperative providing parking brake is checked OFF
	16	Nosewheel steering	1	0	0	Caution must be taken in sharp turns and in ramp area
	17	Nosewheel Selector Valve	1	0	0	Flight Crew Check may be negative

LANDING GEAR AND BRAKES

REF. NO.		ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
P	18	Water anti-ingestion deflectors		-	-	** (m) May be partly or totally missing providing: (a) take-off runway is dry, or if wet, there are no significant pools of standing water. (b) Take-off is not permitted from runways on which the average depth of precipitation that covers all or most of the runway exceeds 3mm.

LIGHTS

ATA 33

	REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
	1	Flight Deck				Normal flight permitted if there are sufficient lights to illuminate all instruments and controls.
	2	Passenger Cabin				There must be sufficient lights to illuminate the full length of the Pax. compartment. Avoid, wherever possible, adjacent lamp failures.
	3	Servicing/Freight Hold				Normal flight permitted.
P	4	Navigation Lights	3	3	3	No Concession for night operations.
				0	0	May be unserviceable for daylight operations.
P	5	Lights				
		(a) Landing Lights	2	1	1	Providing, for night operation, taxi lights are serviceable.
				0	0	May be unserviceable for daylight operation.
		(b) Taxi Lights	2	0	0	
		(c) Taxi/Turn-off Lights.	2	0	0	
	6	Anti-collision Lights	3	-	-	Subject to National Regulations
	7	Emergency Lighting System.	1	1	1	No Concession.
	8	Master Warning	1	1	1	No Concession.

(Unchanged)

NAVIGATION

ATA 34

	REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
	1	ADC	2	2	2	No concession
	2	Altimeter	2	2	2	Either Pilots Altimeter, Normal or Standby mode, may be inoperative if both ASIs and Machmeters are serviceable.
	2 A	Standby Altimeter	1	0	0	
	3	Flight Engineer's Altimeter	1	0	0	
	4	Main ASIs				
		(a) Vc indicator	2	2	2	(a) Captain's Standby may be inoperative OR (b) First Officer's ASI normal or Standby mode may be inoperative
		(b) V_{MO} indicator	2	1	1	** (m) ✓ May be inoperative provided "Over speed" warning is serviceable
	5	Standby ASI /Machmeter	1	1	1	
	6	Machmeter				
		(a) Mach indicator	3	2	2	Captain's or Flight Engineer's indicator may be inoperative
		(b) V_{MO}/M_{MO} indicator	2	1	1	
P		(c) Mach/CG Index	2	1	0	Supersonic flight permitted provided Captain's CG indication and bugs are serviceable.
	7	Vertical speed indicator	2	1	1	Captain's VSI must be serviceable Both required for cat 2 or 3 landing.

(Deletion)

NAVIGATION

ATA 34

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
8	Temperature indicator				
	(a) Total	3	2	2	
	(b) Static	2	1	1	
	(c) ISA	2	0	0	
9	Incidence and acceleration indicator				
	(a) Incidence indicator	2	1	1	**(m) One may be inoperative if one Wobbler and the Stick Shaker are serviceable
	(b) Acceleration indicator	2	0	0	
10	Sideslip indicator	2	1	1	Providing: bubbles are serviceable
11	ADI				
	(a) Attitude indicator	2	2	2	No concession
	(b) Bubble	2	1	1	
	(c) D. H. Light	2	-	-	As required to comply with item 23
	(d) Director bars	2	0	0	
	(e) Ground Roll Guidance	2	0	0	
	(f) ILS indicator	2	-	-	As required to comply with item 24
	(g) Pitch Index	2	-	-	One must be operative for a departure with special procedure
	(h) Radio altitude Indication	2	0	0	
	(i) Attitude comparison light	2	0	0	

(Unchanged)

REF. NO.		NORMAL COMPLEMENT		REQUIRED FOR SUPERSONIC FLIGHT		
		ITEM			REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
P	12	Standby horizon	1	1	1	May be inoperative provided, - both ADIs and their normal attitude signals serviceable. - INS 3 serviceable in Attitude. - flight made in VMC day. Aircraft must not depart a station where repairs or replacement can be made.
	13	INS	3	-	-	(a) 3 fully serviceable C4ACs must be fitted ex LHR. (b) 2 fully serviceable C4ACs must be fitted to positions 1 & 2, plus a C4 of any sort, serviceable in ATTITUDE mode, in position 3 for a departure from any other station if a supersonic flight is intended. (c) 2 INS fully serviceable at start of acceleration. (d) 2 INS fully serviceable for a subsonic dispatch provided that a subsonic route is followed and that the standby horizon is serviceable.
P	14	Magnetic heading reference system	2	1	1	One may be inoperative providing forecast conditions at destination and alternate airport are in VMC. Both required for cat 3 landing.
	15	Standby magnetic compass	1	0	0	May be inoperative provided all 3 INS are serviceable, and 2 independent heading indicators are available including one RMI on each side. Aircraft must not depart a station where repairs or replacement can be made.
	16	HSI				
		(a) Compass card	2	1	1	One may be inoperative if the other magnetic heading readings are available.
		(b) HDG/TRK select index.	2	1	1	
		(c) Course/track deviation bar and Course/Desired Track pointer	2	1	1	
		(d) Glide Index	2	0	0	May be inoperative providing associated ADI Glide Index is serviceable.

	REF. NO.	NORMAL COMPLEMENT ITEM		REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
		(e) Heading comparison Light	2	0	0	
		(f) Drift Index	2	0	0	
		(g) Ground Speed indicator	2	0	0	
		(h) "Distance to Go" indicator	2	0	0	
		(i) Annunciators		-	-	TRUE-MAG and RAD-INS should not be inoperative simultaneously.
	17	RMI and VOR system	2	-	-	) Two VOR, two ADF OR One VOR and) one ADF must be serviceable.
	18	RMI and ADF system	2	-	-	)
	19	DME	2	0	0	One must be operative if required by in-flight procedures.
P	20	Weather Radar	1	-	-	(a) Equipment partially duplicated Failure of a duplicated item is permissible or (b) Dispatch with total failure of the trace is permissible if forecast weather conditions for the route are favourable.
P	21	ATC Transponder	2	1	1	One must be serviceable NOTE 1: If the transponder is unserviceable, permission to proceed must be requested from ATC who may allow the flight to continue normally, For in-flight failure of transponders, refer to Navigation Manual. NOTE 2: Altitude Reporting Function is required in the following countries: Australia, Austria, Belgium, Denmark, France, W.Germany, Ireland, Italy, Libya, Switzerland, U.K. and USA.
	22	Marker	1	0	0	May be inoperative if not required on approach
	23	Radio Altimeter	2	1	1	** (o) Both required for Cat 3 landing.
	24	ILS Receiver	2	-	-	(a) Normal flight permitted with one inoperative. (b) Both may be inoperative if weather conditions at destination or alternate airport are favourable. (c) Both required for cat 3 landing.

(Unchanged)

REF. NO.		ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
	25	Attitude data selector (ATT-INS)	2	2	2	The five dual switching units connected with these ten selectors are identical and interchangeable with each other and with the two dual switching units of the two FD selectors (refer to MEL 05.02.06 Item 10)
●	26	NAV-DATA selector (RAD-INS)	2	2	2	
	27	NAV-INS selector	2	1	1	
	28	COMP selector	2	2	2	
	29	DEV selector	2	1	1	
	30	Inertial system comparator				Refer to MEL 05.02.06, Item 7.
	31	Ground Proximity Warning	1	0	0	May be unserviceable. Aircraft must not depart from a station where repairs or replacement can be made.

(Unchanged)

OXYGEN

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
1	Crew Oxygen (Fixed)	3	3	3	**(o) see 35.1 for minimum bottle pressure
2	Flight Crew Oxygen (Portable)	1		1	
3	Supernumerary Oxygen	2	-	-	Each supernumerary crew member must have fully serviceable oxygen supply and mask.
4	Passenger Oxygen Flight above 8,000 feet				**(o) see 35.4 for minimum minimum bottle pressure.
5	Therapeutic Oxygen Mask	6	-	-	Must have at least one for every 50 pax.
6	Cabin Crew Portable Oxygen (Bottles and full face masks).	-	-	-	One required for each cabin crew member.
7	Smoke Goggles	3	3	3	No Concession
8	Passenger Oxygen Mask. (For Demonstration)	2	1	1	Provided mask is demonstrated in forward and rear cabin.

RAM AIR TURBINE

ATA 49

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
1	Ram Air Turbine	1	1	1	No concession

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(unchanged)

DOORS

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
	ATA 52 CABIN AND FREIGHT HOLD DOORS				
1	Indication				Normal flight permitted if checks prove that the malfunction is in the warning system. Flight crew to check that door is 'Home' and handles in locked condition. If indicated fault is on cabin passenger/service door, check that top flap is fully closed. If indicated fault is Misc. hatches check all four hatches.
2	Locking and Hingeing				No Concession.
3	Doors - Emergency Exit Function	6	5	5	See MEL page 05.02.09.
	ATA 56 WINDOWS				
1	Cabin, Flight Deck and Visor Windows	-	-	-	**(m) Normal flight permitted if damage is within allowable limits. NOTE: Operation with any condition/damage permitted in the Despatch Deviation Procedure is subject to compliance with operating limitations as defined in the Abnormal Procedure, "FAILURE OF WINDOWS."

INTAKE CONTROL

REF. NO.		NORMAL COMPLEMENT ITEM		REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
	1	Air Intake Control Units	8	7	4	Normal flight permitted with one 'Lane' inoperative (Supersonic) or at least one 'Lane' per intake (Subsonic). Providing that Ramp and Spill Manual inching facilities are available in any intake with a failed 'Lane'.
P	2	Spill door actuators and mechanism	4	4	3	**(o) Subsonic flight permitted provided that, - spill door can be set and maintained at subsonic position. - aux inlet is serviceable - spill door manual inching serviceable. - spill door indication serviceable.
P	3	Ramp actuator and mechanism	4	4	0	**(o) Subsonic flight only permitted. **(m) Providing ramp mechanism can be set for subsonic operation and retained in that position.
P	4	Secondary air door	4	4	0	(a) Failed Shut for Performance Limitation see Performance Manual Section 5.
			4	4	4	(b) Failed open. No concession
	5	Auxiliary inlet vane	4	4	4	No Concession
	6	α Vane signal to AICS	2	0	0	
	7	Intake pressure ratio error Indication System	4	3	0	Supersonic flight is permitted, provided two lanes of the intake are serviceable and their ramp and spill position indicators are serviceable.
	8	Ramp Indicator Spill Indicator	4 4	3 3	0 0	Failed indicator must not be associated with failed control channel and sensing. Both the ramp and spill indications may be inoperative provided they are on the same intake.

INTAKE CONTROL

ATA 71

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
9	Auxiliary inlet MI	4	0	0	**(m) Associated vane must be inspected before each flight
10	α Warning Light	1	0	0	Apply procedure INTAKE INCIDENCE SIGNAL FAILURE LIGHT ON
11	N_1 SIG Warning Light	4	3	0	Apply procedure INTAKE N_1 SIG LIGHT ON
12	Intake HYD Warning Light	4	3	3	Operate normally, provided associated Hydraulic system is serviceable
13	INT Warning Light	4	3	3	Normal flight permitted, provided associated Lane Warning Lights and Lane In Use lights are serviceable.
14	Lane Fail Warning Lights	8	7	7	Set the affected Lane Selector to the Auto position associated with the failed Lane light. NOTE: For items 9 and 11 to 14 inclusive, only one failed item in any one intake permitted.
15	System Pressure Switch (Manifold)	3	2	2	
16	Ramp & Spill Manual inching facility	4	3	3	Normal flight permitted providing all intake lanes are serviceable

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
1	Engine Fuel Control System	4	4	4	No concession
2	Not used				
3	Fuel Filter	4	4	4	No concession
4	Fuel Heating System				
	Auto	4	0	0	**(o) Provided associated manual system is serviceable
	Manual	4	3	3	NOTE: If any fuel heater is totally inoperative flight is only permitted if the fuel contains an approved icing inhibitor. See Flying Manual 2A Limitations
5	Recirc. Valve	4	4	4	No Concession
6	Fuel Flow Indication	4	3	3	See 05.02.45.
7	HP Valve Indication System	4	0	0	
8	Engine Fuel Temperature Indication System	4	3	0	Acceptable sub-sonic provided System Fuel Temperature gauge is serviceable.
9	HP Valve	4	4	4	No concession
10	LP Overspeed Governor	4	4	4	No concession

IGNITION

REF. NO.		ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
		ENGINE				
P	1	Ignition System	8	4	4	Dry Runways and NO forecast of icing conditions
			8	7	7	Wet Runways or Forecast of icing conditions

(Unchanged)

REF. NO.		ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
P	1	Engine Anti-Ice	4	2	2	(a) **Failed off.** **One per side may be unserviceable when weather reports and forecasts at the time of departure indicate that icing conditions are not likely to be met.** (b) Failed on. **(o) **(m) Apply maintenance procedure to close the valve. If this action is not practicable, one flight is permitted with the valve failed open. If the OAT at take-off is above +3°C, see Performance Manual section 5, for penalty.

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(Unchanged)

ENGINE CONTROL

ATA 76

REF. NO.		ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
	1	Engine Electronic Control System	8	7	7	** (o)
P	2	Contingency Rating Selection System	4	0	0	**The aircraft may be dispatched with the Contingency Rating selection system inoperative, for one or more engines.** See Performance Manual section 5 for Performance Penalty.

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REF. NO.	NORMAL COMPLEMENT ITEM		REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
1	Engine Instruments				
	(a) T/O Monitor Caption	4	-	-	**(o) Only one of the 12 inoperative provided all instruments in (b) are serviceable. All 12 instruments must be serviceable when dispatching from main base. The Operational Procedure defines the limitations applicable to this concession.
	Fuel Flow	4	-	-	
	P7	4	-	-	
	(b) N_1	4	-	-	**(o) Normal flight permitted with one inoperative instrument per engine provided that the inoperative instruments are not of the same type and all the instruments in (a) are serviceable. The Operational Procedure defines the limitations applicable to this concession.
	N_2	4	-	-	
	EGT	4	-	-	
	Area	4	-	-	
2	Turbine Cooling Air Warning System	4	4	4	No concession.
	Turbine Cooling Air Temperarure Indication	4	0	0	
3	Engine Overheat Warning System	4	4	4	No concession.
4	Vibration Indication System				**(m)
	Front	4	3	3	Normal flight permitted for eight flights only.
	Rear	4	0	0	Normal flight permitted for 25 flights only.
5	Reheat Fault Warning Light	4	0	0	Normal Flight permitted

REF. NO.		ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
P	1	Secondary Nozzles (Bucket Control)	4	3	3	(*) One may be inoperative providing there is no brake failure on the same side. ** (o) ** (m) The inoperative nozzle must be locked within the range 10° to 27°, preferrably at 10°. The nozzle must be locked at 10° if inoperative due removal of a failed ballscrew gearbox. Refer to Performance Manual section 5 for take-off performance and en-route fuel penalties.
	2	Primary Nozzles	4	4	4	No concession
	3	Jet Pipe	4	4	4	No concession
	4	Nozzle Angle Scheduling Unit (NASU)	2	1	1	** (o) ** (m) One NASU may be U/S. Must remain in rack and connected.
P	5	Reheat Fuel Control System	4	3	3	** (o) See Performance Manual section 5, ONE REHEAT INOPERATIVE, for performance limitations. ** (m) "Reheat off" signal to engine amplifiers & "Automatic Contingency" selection signal must be operative on the associated engine.
P	6	Reheat Ignition System	4	3	3	** (o) See Performance Manual section 5, ONE REHEAT INOPERATIVE, for performance limitations. ** (m) "Reheat off" signal to engine amplifiers & "Automatic Contingency" selection signal must be operative on the associated engine.

(Unchanged)

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
1	Oil storage and distribution System	4	4	4	No concession NOTE: In the event of a CSD input shaft oil seal failing, engine oil will appear from the seal interspace overboard drain. To prevent further loss of oil the drain pipe may be blanked in accordance with DDP 24.1 on page 05.03.05.
2	Oil System Indications				
	(a) Low oil pressure warning light	4	4	4	No concession
	(b) Pressure Indication	4	-	-	) Normal flight permitted with one) unserviceable instrument per) engine provided the failed) instruments are not of the same) type. NOTE: 1. Not more than 8 flights permitted with oil temperature indicator inoperative. 2. Normal flight is permitted with unserviceable tank contents indicator provided oil level is checked after flight and there is no evidence of abnormal consumption or leakage
	(c) Oil Temperature	4	-	-	
	(d) Tank contents	4	-	-	
	(e) Overfull Indication	4	0	0	Provided normal contents indication serviceable and level checked correct before flight.

STARTING

ATA 80

REF. NO.	ITEM	NORMAL COMPLEMENT	REQUIRED FOR SUPERSONIC FLIGHT	REQUIRED FOR SUBSONIC FLIGHT	LIMITATION/PROCEDURE
1	Starter Cut Out	4	0	0	Normal flight permitted if operated manually.
2	Start Valve	4	0	0	Normal flight permitted if operated manually.

(Unchanged)

DESPATCH DEVIATION PROCEDURES

AIR CONDITIONING

ATA 21

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
21.1 - Air Conditioning Group Switch the associated Conditioning Valve to Off. Set the associated temp control c/o switch to Failed. After engine start set the other 3 Conditioning Valves to Boost. If the fault is upstream of the Conditioning Valve, shut the Bleed Valve.	
21.2 - Bleed and Pressure Control Valve None	(b) Close mechanically (See Maintenance Manual 21-00-00) Page 301
21.4 - Conditioning Valve (a) Failed Shut Switch Conditioning Valve Off. Set the associated temp control c/o switch to Failed. After start set the other 3 Conditioning Valves to Boost.	(a) Failed Shut None
(b) Failed Open After engine start, - Bleed Valve open - Cond. Valve open - test selector to appropriate FLOW - test switch to TEST - observe mass flow reduces to zero - test switch and selector to OFF - observe flow re-established.	(b) Failed Open If the Mass Flow Valve fails to test, mechanically close the Conditioning Valve in accordance with Maintenance Manual instructions 21-00-00 Page 301.
21.8 - Ram Air Valve (b) Failed Shut If the Ram Air Valve cannot be opened mechanically, - switch the associated Conditioning Valve to Off - set the associated temp. control c/o switch to Failed - after engine start set the other 3 Conditioning Valves to Boost.	(b) As needed, open mechanically. (See Maintenance Manual 21-00-00) Page 301.
21.9 - Fuel Throttle Valve (failed shut) If the Fuel Throttle Valve cannot be opened mechanically, shut down the associated group as in 21.8.	(b) As needed, open mechanically (See Maintenance Manual 21-00-00 P301).

(Unchanged)

DESPATCH DEVIATION PROCEDURES

AIR CONDITIONING

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
21.10 -Temperature Control System If no control in Auto AND Standby, shut down the associated group as in 21.8	
21.12 -Cabin Inlet Safety Valve Shut down the associated group as in 21.8	
21.13 -Primary Exchanger, Secondary Exchanger & Duct warnings Shut down the associated group as in 21.8	
21.17 -C.A.U. Leak detection Shut down the associated group as in 21.8	
21.21 -Discharge Valve Position Indicator Before flight, select pressure control system which has position indicators serviceable.	None
21.22 -Cabin Altimeter To convert cabin differential pressure into cabin altitude use following table.	None
21.23 -Differential Pressure Indicator To convert cabin altitude into cabin differential pressure, use following table.	None

21.31 -Fwd Rack Extract Fans

1. Failure of one fan will result in a drop of 15% in air flow at the start and end of flight when cabin differential pressure is less than 2 p.s.i.

2. In order to restrict operation of racked equipment at temperatures above rated maximum continuous, ground running with only 2 forward extract fans operating must be limited to one hour if cabin temperature exceeds the following values:-

   33°C at airfield altitudes up to 2,000 feet.

   30°C at airfield altitudes between 2,000 feet and 4,500 feet.

   24°C at airfield altitudes between 4,500 feet and 8,500 feet.

   This procedure should be applied by flight crew or ground crew as appropriate.

(Deletion)

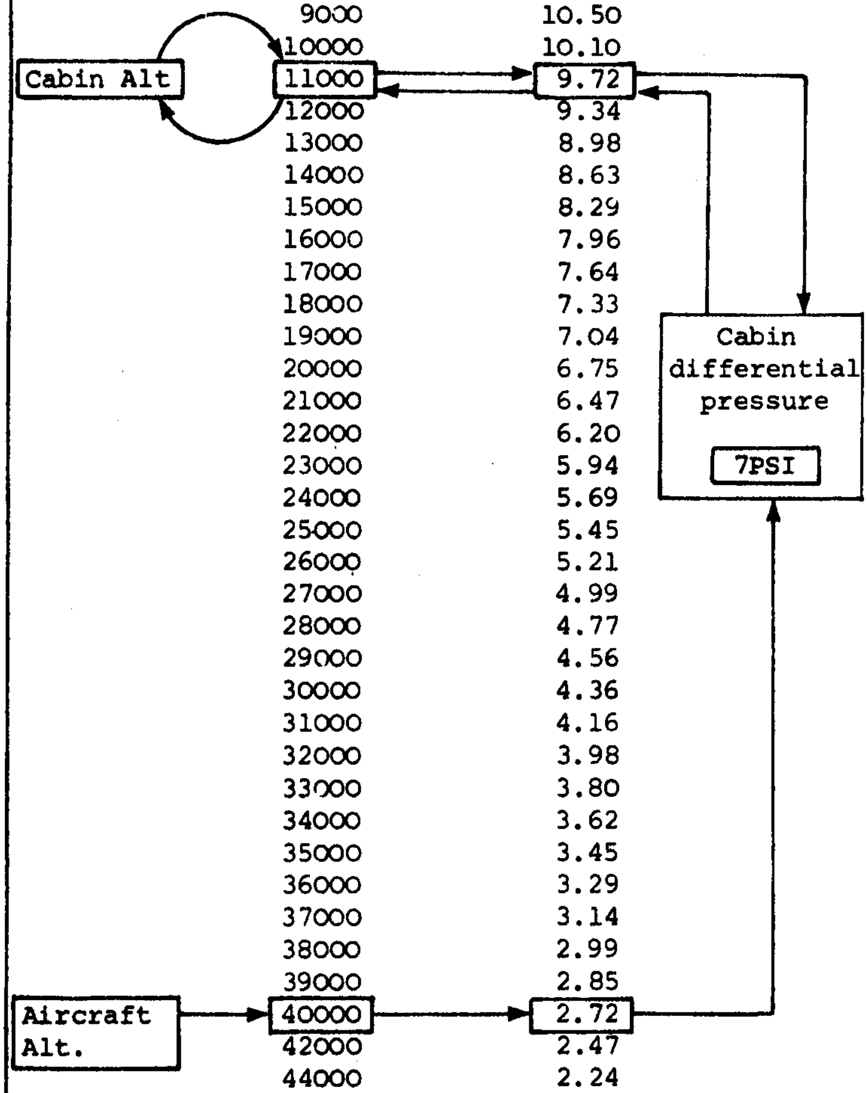
DESPATCH DEVIATION PROCEDURES

AIR CONDITIONING

ATA 21

OPERATIONAL PROCEDURES

MAINTENANCE PROCEDURES



ALTITUDE (feet)	PRESSURE (PSI)
- 1000	15.23
0	14.69
1000	14.17
2000	13.66
3000	13.17
4000	12.69
5000	12.22
6000	11.77
7000	11.33
8000	10.91
9000	10.50
10000	10.10
11000	9.72
12000	9.34
13000	8.98
14000	8.63
15000	8.29
16000	7.96
17000	7.64
18000	7.33
19000	7.04
20000	6.75
21000	6.47
22000	6.20
23000	5.94
24000	5.69
25000	5.45
26000	5.21
27000	4.99
28000	4.77
29000	4.56
30000	4.36
31000	4.16
32000	3.98
33000	3.80
34000	3.62
35000	3.45
36000	3.29
37000	3.14
38000	2.99
39000	2.85
40000	2.72
42000	2.47
44000	2.24
46000	2.03
48000	1.85
50000	1.68
52000	1.52
54000	1.38
56000	1.26
58000	1.15
60000	1.04
62000	0.94
64000	0.85

(Unchanged)

DESPATCH DEVIATION PROCEDURES

AUTOMATIC FLIGHT CONTROL

ATA 22

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
22.3 - Autostabilisation None	Check the Stick Shaker and remaining Wobbler as detailed on page 05-03-04A or 05-03-04B.
22.4 - Autothrottle (b) For landing limitations see Performance Manual Section 4.	None
22.7 - Inertial System Comparator In IFR conditions, aircraft must be handled by captain in manual or automatic mode. Captain to cross check normal and stand-by horizons.	None
22.11 - ITEM None.	Computer may be removed provided that dummy ITEM computer D92 1676 000 is fitted in its place. See Maintenance Manual 22-42-11.

22.3 - Check of the Stick Shaker & the No.1 Stick Wobbler (Flight Crew
& or Ground Crew).
27.2 Flying Controls & Intakes .... Verify Clear
27.11 ADC 1 .... ON
34.9a ADC 2 .... OFF
ADC 1 TEST sel .... TEST 1

WHEN TEST LIGHT ON
ADC 1 .... RESET
STICK SHAKER .... VERIFY ACTIVATED
STICK SHAKER C/B .... TRIP

CIRCUIT BREAKER	PANEL	GRID REF
STICK SHAKER SUP	1-213	P15

No.1 PITCH ARTIFICIAL FEEL .... ENGAGE
No.2 PITCH ARTIFICIAL FEEL .... DISENGAGE
No.1 ANTI STALL SYSTEM .... ON
No.2 ANTI STALL SYSTEM .... OFF
O & M and INNER ELEVONS .... MECHANICAL SIGNALLING
RUDDER .... MECHANICAL SIGNALLING
BLUE HYDRAULIC SYSTEM .... PRESSURISE
LH UC WEIGHT SW C/Bs .... TRIP

CIRCUIT BREAKER	PANEL	GRID REF
LH UC WEIGHT SW 'A' SYS SUP	1-213	M17
LH UC WEIGHT SW 'B' SYS SUP	3-213	B8

PULL BACK ON CONTROL COLUMN AND HOLD UNTIL STICK WOBBLER IS ACTIVATED (ABOUT 5 SECONDS)

GROUND HYD CHECK OUT PUMPS .... OFF
ADC 1 TEST sel .... NORMAL
STICK SHAKER CB .... RESET
LH UC WEIGHT SWITCH CBs .... RESET
ADC 2 .... ON
ADC 1 & ADC 2 .... RESET
No.2 ANTI STALL SYSTEM .... ON
No.1 & No.2 AUTO STAB .... ENGAGE
No.1 & No.2 ARTIFICIAL FEEL .... ENGAGE
No.1 & No.2 ELECTRIC TRIM .... ENGAGE
O & M and INNER ELEVONS SIGNALLING CHANNELS .... AS REQUIRED
RUDDER SIGNALLING CHANNEL .... AS REQUIRED

END//

22.3 & 27.2 27.11 34.9a - Check of the Stick Shaker & the No.2 Stick Wobbler (Flight Crew or Ground Crew)

Flying Controls & Intakes .... Verify Clear
ADC 2 .... ON
ADC 1 .... OFF
ADC 2 TEST sel .... TEST 1

WHEN TEST LIGHT ON
ADC 2 .... RESET
STICK SHAKER .... VERIFY ACTIVATED
STICK SHAKER C/B .... TRIP

CIRCUIT BREAKER	PANEL	GRID REF
STICK SHAKER SUP	1-213	P15

No.2 PITCH ARTIFICIAL FEEL .... ENGAGE
No.1 PITCH ARTIFICIAL FEEL .... DISENGAGE
No.2 ANTI STALL SYSTEM .... ON
No.1 ANTI STALL SYSTEM .... OFF
O & M and INNER ELEVONS .... MECHANICAL SIGNALLING
RUDDER .... MECHANICAL SIGNALLING
EMERG GEN sw .... ISOL
GREEN HYDRAULIC SYSTEM .... PRESSURISE
RH UC WEIGHT SW C/Bs .... TRIP

CIRCUIT BREAKER	PANEL	GRID REF
RH UC WEIGHT SW 'A' SYS SUP	1-213	M18
RH UC WEIGHT SW 'B' SYS SUP	3-213	B9

PULL BACK ON CONTROL COLUMN AND HOLD UNTIL STICK WOBBLER IS ACTIVATED (ABOUT 5 SECONDS)

GROUND HYD CHECK OUT PUMPS .... OFF
ADC 2 TEST sel .... NORMAL
STICK SHAKER CB .... RESET
RH UC WEIGHT SWITCH CBs .... RESET
ADC 1 .... ON
ADC 1 & ADC 2 .... RESET
No.1 ANTI STALL SYSTEM .... ON
No.1 & No.2 AUTO STAB .... ENGAGE
No.1 & No.2 ARTIFICIAL FEEL .... ENGAGE
No.1 & No.2 ELECTRIC TRIM .... ENGAGE
O & M and INNER ELEVONS SIGNALLING CHANNELS .... AS REQUIRED
RUDDER SIGNALLING CHANNEL .... AS REQUIRED
EMERG GEN sw .... NORM

END//

DISPATCH DEVIATION PROCEDURES

ELECTRICAL GENERATION

ATA 24

MAINTENANCE PROCEDURE

24.1 GENERATION CHANNEL including C.S.D.

In the event of a C.S.D. input shaft oil seal failing, engine oil will appear from the seal interspace overboard drain. To prevent further loss of oil - blank off the drain pipe as given below.

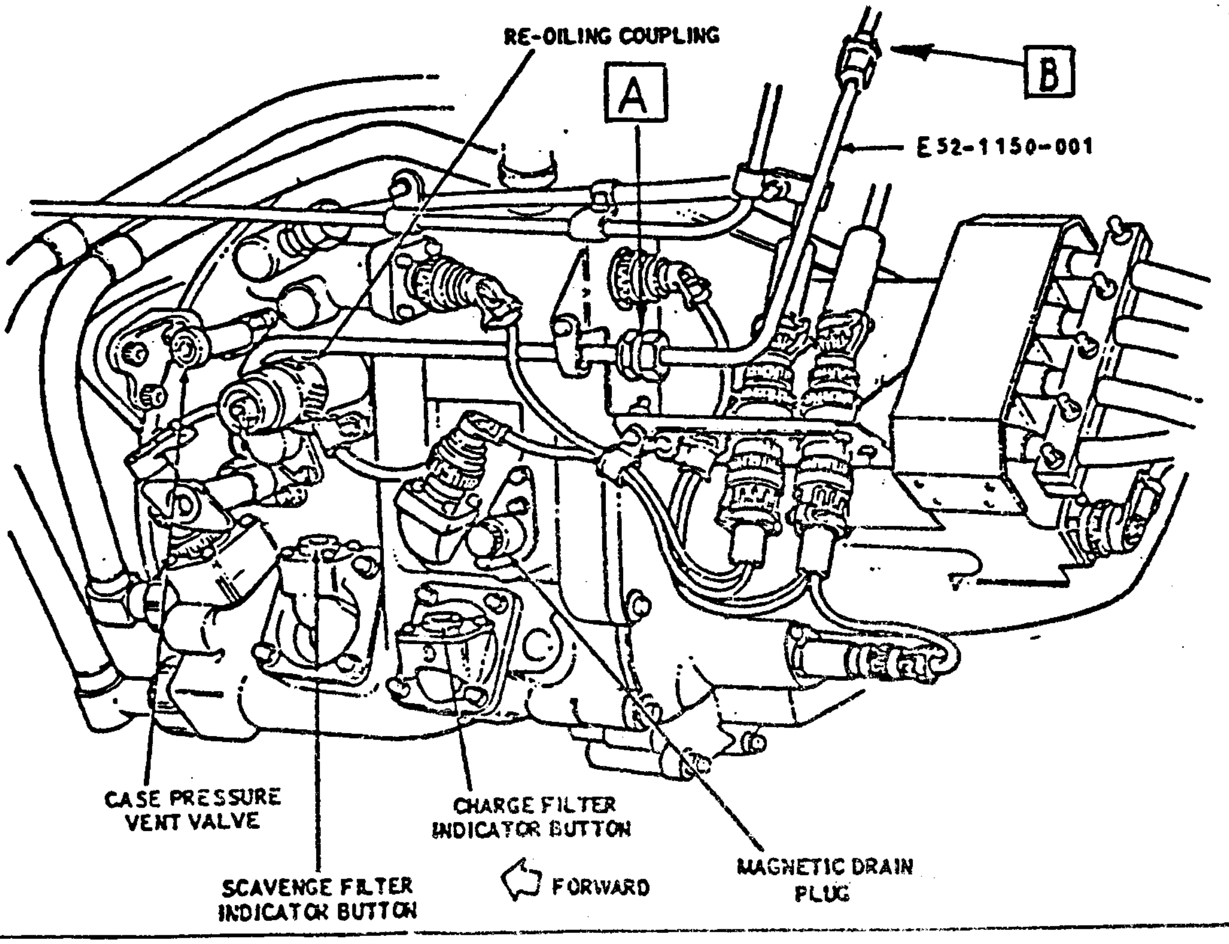
This practice has been accepted by BAe/Lucas/CAA, allowing two IDGs to be blanked per aircraft for a maximum period of 150 hours subject to an oil level check not exceeding 75 hours.

Should an oil loss be detected at this check then the IDG must be removed.

It is not permissible to add oil under these circumstances.

Blanking-off Procedure:

1. Remove pipe part No. E52-1150-001.
2. Fit blank (AS 15826) to IDG seal interspace drain pipe end at rear of generator ('A').
3. Fit union body (AS 27468) and blank (AS 15826) to drain block pipe end adjacent to pipe clip at engine bottom centre line ('B').
4. Stow pipe part No. E52-1150-001 for re-use.



OPERATIONAL PROCEDURES

25.3 - Doors - Emergency Exits, Escape Slides/Slide Rafts

One emergency exit OR one escape slide or slide/raft may be U/S provided that the following limitations are applied:

(1) For routes over land, 100 passengers may be carried.

(2) For routes over water if the unserviceability does not affect a slide raft or its associated exit, 100 passengers may be carried.

(3) For routes over water if the unserviceability renders a slide/raft unuseable:-

(a) If an additional 36-man liferaft is carried, the passenger load may be 98. In order to stow this raft the rear RH seat pair is moved forwards and the raft attached to the seat rails.

For loadsheet purposes the weight is 59 kg and IUs plus 1.2.

(b) If an additional liferaft is not carried, the total load (passengers plus crew) is restricted as shown below.

EXIT UNUSEABLE	MAX PERSONS ON BOARD (PASSENGERS PLUS CREW)
FWD LH	88
CENTRE LH	88
CENTRE RH	98

(4) All other passenger and service doors and associated slides must be serviceable.

MAINTENANCE PROCEDURES

If an emergency exit is inoperative it must have the words "Exit" or "Emergency Exit" covered and must be marked by a red disc at least 9 inches in diameter with a white horizonaal line across it bearing the words "No Exit" in red letters.

If an additional liferaft pack is to be stowed, move the rear RH seat pair forwards, reconnect it to the seat rails, then attach the pack to the seat rails behind the rear seat row.

The inoperative door, slide or emergency exit must be repaired at the next station possessing the appropriate repair facilities.

Continued....

(Unchang

DESPATCH DEVIATION PROCEDURES

FLIGHT CONTROLS

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
27.2 - Artificial Feel See Flying Manual Section 8, Loss of Artificial Feel.	Pitch Carry out check of the Stick Shaker and the remaining Pitch Feel/Wobbler system as detailed on page 05.03.04A or 05.03.04B of this section. Roll Carry out the following check, - select Test 1 on ADC front face - engage serviceable Feel lane - ensure elevons clear - pressurise appropriate hydraulic system - move control column in roll and observe increased feel force. Yaw Check (see Maintenance Manual 27-22-00 Page 501)
27.8 - Flight Control Position Indicator a) Elevon deflection to be read on the pitch trim control wheel when aircraft is trimmed in steady flight.	None
27.9 - Inner Elevon Warning Light During flight: 1) Before transonic acceleration check both inner elevons respond correctly to control column movement in pitch and roll. 2) Limit bank angles at 20° during transonic flight 3) Descent in transonic flight at 350 Kts	None
27.11 - SFC - Emergency Control System Trip affected circuit breakers:	Check the Stick Shaker and remaining Wobbler as detailed on page 05.03.04A or 05.03.04B of this section.

CIRCUIT	PANEL	GRID REF
SFC 1	1.213	S 20
	13.215	E 6
	13.215	F 6
SFC 2	5.213	D 17
	13.216	C 17
	13.216	C 16

DESPATCH DEVIATION PROCEDURES

FLIGHT CONTROLS

ATA 27

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
SFC - Anti-stall System	Check the Stick Shaker and remaining Wobbler as detailed on page 05.03.04A or 05.03.04B of this section.
CAT. 3 LANDING Loss of one Anti-stall system involves loss of corresponding Pitch Auto-stab below 270 Kts. This logic is inhibited after localiser capture, permitting engagement of associated A/Stab and A/P; to restore land 3 capability use the following procedure - When LAND light ON: Affected pitch autostab .... ON Affected A/P .... ON Land 3 light .... CHECK Removal - A failed SFC may be removed providing following procedure applied during flight: Engage pitch autostab associated with missing SFC only after failure of opposite pitch autostab.	All AFCS boxes must be left in racks connected and powered when failed; except that a failed SFC computer may be removed.

MAINTENANCE PROCEDURE

27-19 DROOP NOSE AND VISOR

To check validity of signal to Nose Magnetic indicator:-

1. Remove Droop Nose and Visor indicator panel 2-212-6 and disconnect plug.

2. Select Droop Nose to 'DOWN'

   (a) Connect Voltmeter capable of reading 28V between Pin T(+) and Pin U(-).
   Check for zero Volts.
   Select Droop Nose 'UP'
   When Nose is checked visually to be in the 'UP' position, Voltmeter should read 28V (approx.).

   (b) Connect Voltmeter between pins T(+) and R(-).
   Check for zero Volts.
   Select Droop Nose 5°.
   When Nose is checked visually to be in the 5° position, Voltmeter should read 28V (approx.).

   (c) Connect Voltmeter between pins T(+) and P(-).
   Check for zero Volts.
   Select Droop Nose 'DOWN'
   When Nose is checked visually to be in the DOWN position, Voltmeter should read 28V (approx.).

OPERATIONAL PROCEDURES

28.1 - Collector Tank Pumps

- If tank 9 is full, open the affected tank jettison valve and switch on the same side tank 9 pump. When reheat has been switched off after take-off, switch off the tank 9 pump and shut the tank jettison valve.
- If tank 9 is not full, reheat must not be used on the affected engine. See Performance Manual section 5, Dispatch with One Reheat U/S.

28.8 - By-pass Valve

None.

MAINTENANCE PROCEDURES

If a tank 9 pump is to be used to back up engine feed during next take-off, a water check must be carried out on tank 9.

(a) Electrically isolate the by-pass valve by tripping the associated circuit breaker.

By-Pass Valve Supply.	Panel.	Grid Ref.
Engine 1.	15-215	F24
Engine 2.	15-216	E 5
Engine 3.	15-215	F25
Engine 4.	15-216	E 6

(b) Disconnect the electrical plug from the motor.

(c) Remove the four bolts securing the gearbox and motor and withdraw from the valve body.

(d) Ensure that the flap shaft turns freely in the valve unit, and the shaft in the gear box can be turned against the spring tension. If the failed gearbox and motor is in the open position, remove the motor and fit only the gearbox

(e) With the flap valve in the closed position fit the gearbox to the valve body so that the splined drive shaft and the gearbox joint ring engages in the valve body.

(f) Turn the gearbox so that the bolt holes are aligned and the torsion spring is tensioned to hold the valve flap in the closed position. Secure with the four bolts.

(g) Tape and stow the disconnected electrical plug by lashing to a suitable support.

(h) Ensure that the Circuit Breaker remains tripped.

FUEL

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
28.9 - Fuel/Hyd. Heat Exchanger None	Make a visual check of the dry bay above the nacelles.
28.10 - Fuel/Air Heat Exchanger - switch the associated Bleed Valve to Shut - switch the associated Conditioning Valve to Off - set the associated temp control c/o switch to Failed. - after engine start set the other 3 Conditioning Valves to Boost.	Leak check in accordance with Maintenance Manual 21-12-33 Page 601.
28.16 - 5A & 7A Pumps Tank(s) with both pumps u/s must be empty. See Load & Balance Manual Section 6 and Refuel Book Section 2. If tank 5A or 7A remains empty with the other filled, all 3 CG computer outputs will be in error. Main CG will agree (subject to other lateral imbalance) with Standby CG of empty tank side; both will indicate approx. 0.3% forward of true CG. The Standby CG of the filled tank side will indicate approx. 0.3% aft of true CG. The difference (approx. 0.6%) can cause a discrepancy warning on the filled tank side Standby CG. Whilst the "filled" tank side contains fuel true CG will be an average of Standby 1 and Standby 2 CGs. The errors will reduce to zero as the filled tank is emptied.	See Refuel Book section 2, "Refuelling with 5A and/or 7A Remaining Empty".
28.18 - Transfer Control Valve Maintain affected collector tank(s) at correct level by selective use of Transfer pump(s)	None.
28.19 - Transfer Shut-off Valves (5A and 7A) As for 28.46 below See 28.16 above for CG advice.	None.
28.25 - Pump Low Pressure Indication Trip pumps circuit breakers: 14.216 B1 13.215 C19 Trip inlet valve circuit breaker 15.215 E22	None.

(Completely Revised)

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
28.32 - Vent Shut-off Valve Trip valves circuit breakers: 1.213 K 16 3.213 D 7	None.
28.34 - Scavenge Pump and Sensor Trip Scavenge Pump Supply CB 14.216 E 4	None
28.38 - Scavenge Non Return Valve Trip Scavenge Pump Supply CB 14.216 E 4	None
28.46 - Tank 5A and/or 7A Empty Flight permitted with no fuel in tanks 5A and/or 7A. See Load & Balance Manual Section 6 and Refuel Book Section 2 See 28.16 above for CG advice.	See Refuel Book Section 2, "Refuelling with 5A and/or 7A Remaining Empty." To manually shut a failed open valve see page 05.03.15
28.47 - Refuelling Valves - Tanks 1,2,3,4,5,6,7,8, & 10.	To manually shut a failed open valve see page 05.03.15

(Completel evised)

MAINTENANCE PROCEDURE

28.46 PROCEDURE FOR MANUALLY CLOSING REFUELLING VALVES IN TANKS 5A, 7A & 9

1. To manually shut a failed "open" valve carry out the following procedure:-

   (a) Electrically isolate the appropriate valve by tripping its circuit breaker.

VALVE	PANEL	GRID REF
5A	15-216	F4
7A	15-216	F5
9	15-216	F9

   (b) Disconnect the electrical plug from the motor.

   (c) Remove the four nuts securing the gearbox and motor and withdraw it from the valve body.

   (d) Using special tool FR.7903722 turn the valve (shut) to a position such that when the special tool is inverted it fits over the valve studs. Secure the special tool in this position with the four nuts. (This ensures the valve is locked in the shut position).

   (e) Cap and stow the elctrical plug and lead.

   (f) Ensure the circuit breaker remains tripped.

2. With valve 9 failed closed, Tank 9 may be replenished by refuelling Tank 10 in the normal manner, then after closing the RCUs ., fuel may be transferred from Tank 10 to Tank 9 by selecting Tank 9 trim valves open and Tank 10 pumps 'ON'. Monitor quantity transferred using Tank 9 contents gauge on fuel management panel. When required quantity of fuel has been transferred, select Tank 10 pumps to 'OFF' and Tank 9 trim valves to Shut. Open RCUs and continue refuel procedure.

   Note:

   If tank 9 valve is manually shut and locked, tank 9 overfull indication will not be inhibited in flight.

28.47 PROCEDURE FOR MANUALLY CLOSING REFUELLING VALVES IN TANKS 1,2,3,4,5,6,7, 8 & 10

1. To manually shut a failed "open" valve carry out the following procedure:

   (a) Electrically isolate the appropriate valve by tripping its circuit breaker.

MAINTENANCE PROCEDURE

28.47 1. /Cont/d...

VALVE	PANEL	GRID REF
1	15-215	E23
2	15-216	F10
3	15-216	F3
4	15-215	E24
5	15-215	E25
6	15-215	F20
7	15-215	F21
8	15-215	F19
10	15-215	E22

(b)
(c)
(d) } As procedure 28.46
(e)
(f)

(g) Placard the appropriate switch on the Flight Deck fuel management panel to show that the valve is inoperative and shut.

2. A tank with a failed "shut" valve may be refuelled as indicated in the table below. Monitor the quantity transferred, using relative tank contents gauge on fuel management panel.

Refuel Valves Failed Shut	Refuel from	Select	
TANK	TANK	Main Transfer Pump, TANK	Tank Interconnect Valve
1	5 or 6	5 or 6 ON	
2	5 or 6	5 or 6 ON	
3	7 or 8	7 or 8 ON	
4	7 or 8	7 or 8 ON	
5	8		5 to 8 Open
6	7		6 to 7 Open
7	6		6 to 7 Open
8	5		5 to 8 Open
10	-		

NOTE:

1. If the refuelling valve of either of tanks 1, 2, 3, 4, or 10 are manually shut, and locked, its magnetic indicator on the Flight Deck Management Panel will show cross-hatched.

2. If the refuelling valve of either of tanks 5 or 7 are manually shut, and locked, its overfull indication on the Flight Deck Management panel will not be inhibited in flight.

28-48)
28-49)
28-50)
- DISPATCH WITH FAILED FUEL GAUGING CHANNEL

(1) DISPATCH WITH FAILED FUEL GAUGING IN TANK 1,2,3,4,5,5A,6,7,7A or 8

- Identify failed channel and paired channel. Channel pairings are:-

1	2	5	5A	6
4	3	7	7A	8

- Throughout flight, monitor the paired channel. Whenever the tank with the paired channel is not in use, monitor for any significant change in the contents indication.

  If paired channel is in a collector tank or a main transfer tank, when that tank is in use, monitor for any unexpected sudden change in contents indication.

  A failure of the paired channel will not be indicated by a comparator light, may not be indicated by an indicator failure flag and may result in false CG indication. If, as a result of monitoring, failure of the paired channel is suspected, apply procedure TOTAL LOSS OF CG DATA.

  Before engine start, recheck the paired channel.

  . read gauge and compare with refuelling sheet
  . press to test and observe correct movement
  . Recheck the main CG and valid standby CG indications are within 0.2% of each other and agree with the loadsheet take-off CG.

- The Total Contents indicators will be in error and must not be used.

(2) IDENTIFICATION OF FAILED CHANNEL IN TANK 9, 10 OR 11 WITH NO FAILURE LIGHTS ON

Fuelling completed or held at a known quantity in suspected tank.

Rotate the FQI test rty sel to MAX A.
Set and hold the FQI test sw to CANCEL
Observe direction of pointer movement on suspected FQI.

IF SUSPECT FQI POINTER FAILS TO MOVE

Release the FQI test sw
The indicator is mechanically jammed

The Main CG output will be suspect but STBY I and STBY 2 will be correct.

Take-off is not permitted.

END//

IF SUSPECT FQI POINTER MOVES TOWARDS THE KNOWN QUANTITY

When the pointer stops at the correct quantity
Release the FQI test sw
Rotate the FQI test rty sel to OFF.
Observe the indicator remains at the correct quantity and No.1 CG discrepancy light is on and the associated 9A,10A or 11A channel light is on.

The fault is in A gauging Channel
Apply procedure at (3) below

contd.

(Completely revised)

OPERATIONAL PROCEDURE

(2) IDENTIFICATION OF FAILED CHANNEL IN TANK 9, 10 OR 11 WITH NO FAILURE LIGHTS ON (Contd.)

IF SUSPECT FQI POINTER MOVES AWAY FROM THE KNOWN QUANTITY

Rotate the FQI test rty sel to MAX B
Set and hold the FQI test sw to cancel
When the pointer stops at the correct quantity
Release the FQI test sw
Rotate the FQI test rty sel to OFF.
Observe the indicator remains at the correct quantity and No.2 CG discrepancy light is on and the associated 9B,10B or 11B channel light is on.

The fault is in B gauging Channel
Apply procedure at (3) below.

(3) DISPATCH WITH FAILED FUEL GAUGING CHANNEL IN TANK 9,10 OR 11

Before take-off

Calculate from the chart on Checklist page 07.02.16 the quantity to remain in Tank 9 at end of transfer to 55%.

Before start of rearward transfer:

Record Total Contents reading and Fuel Remaining reading and note discrepancy between them.

At end of first stage transfer (at indicated CG % Co = 55%)

Observe Tank 9 has reduced to predetermined value

Record Total Contents reading and Fuel Remaining reading.

Observe discrepancy between them has not changed by more than 1000 kg.

Before Deceleration

Calculate fuel to remain in tank 11 to acheive 57.5% and 55%.

IF ...... TANK 11 FUEL GAUGING CHANNEL FAILED
Verify TANK 5 AND TANK 7 PUMPS sw and sels off
Record contents of TANKS 9, 5 and 7.

During forward transfer calculate fuel remaining in tank 11 by amount of fuel transferred to tanks 9, 5 and 7.

Do not switch Pumps ON in Tanks 5 and 7 until forward transfer is completed if possible.

During Deceleration

During deceleration do not allow the contents of tank 11 to fall below the quantity calculated for a CG of 57.5% Co until speed less than M = 1.5 and the quantity calculated for a CG of 55% Co until the speed is less than M = 0.93.

(Completely revised)

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
28.59 - CG Computer For a subsonic flight without CG data:- - normal refuelling - PTOTR or PTOBO as per loadsheet instructions. - apply procedure TOTAL LOSS OF CG DATA.	None
28.60 - FQI Control Panel (a) None (b) The error on the CG indicator is negligible. Calculate landing weight by adding fuel on board to the loadsheet ZFW.	None

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DESPATCH DEVIATION PROCEDURES

HYDRAULIC GENERATION

OPERATING PROCEDURES	MAINTENANCE PROCEDURES
29.1 - Hydraulic Pump If a Green pump is U/S , -see Performance Manual Section 5 for limitations. -for take-off, select Yellow into Green at the Servo Control Panel. -when gear up and locked, select Yellow selector back to Normal. -before landing select Yellow into Green again.	Check clogging indicators of HP, case drain, and return filters. If any are protruding replace affected filter(s). If HP filter destroyed, flush affected hydraulic system. See Maintenance Manual 29.00.00 Page 301
29.7 - Reservoir De-Aeration **None**	**Depressurise affected main system accumulator and fit blank on the de-aeration outlet. (See Maintenance Manual 29-00-00 Page 301).**
29.9 - Hydraulic Contents Indicator **None**	**Check level (See Maintenance Manual 12.12.29 Page 301) and pressure switch: with system unpressurised, the warning light HYD on the intake panel should be illuminated.**
29.10 - Reservoir "Low Pressure" Indication **None**	**Check the reservoir air pressure (See Maintenance Manual 29.31.00 Page 501).**
29.12 - Overheat Warning Light If associated system pressure rises to 4500 psi, apply procedure HYDRAULIC FLUID OVERHEAT.	**None**
29.15 - Filters	If more than one filter in a system shows a "blocked" indicator, check all remaining filters in that system.

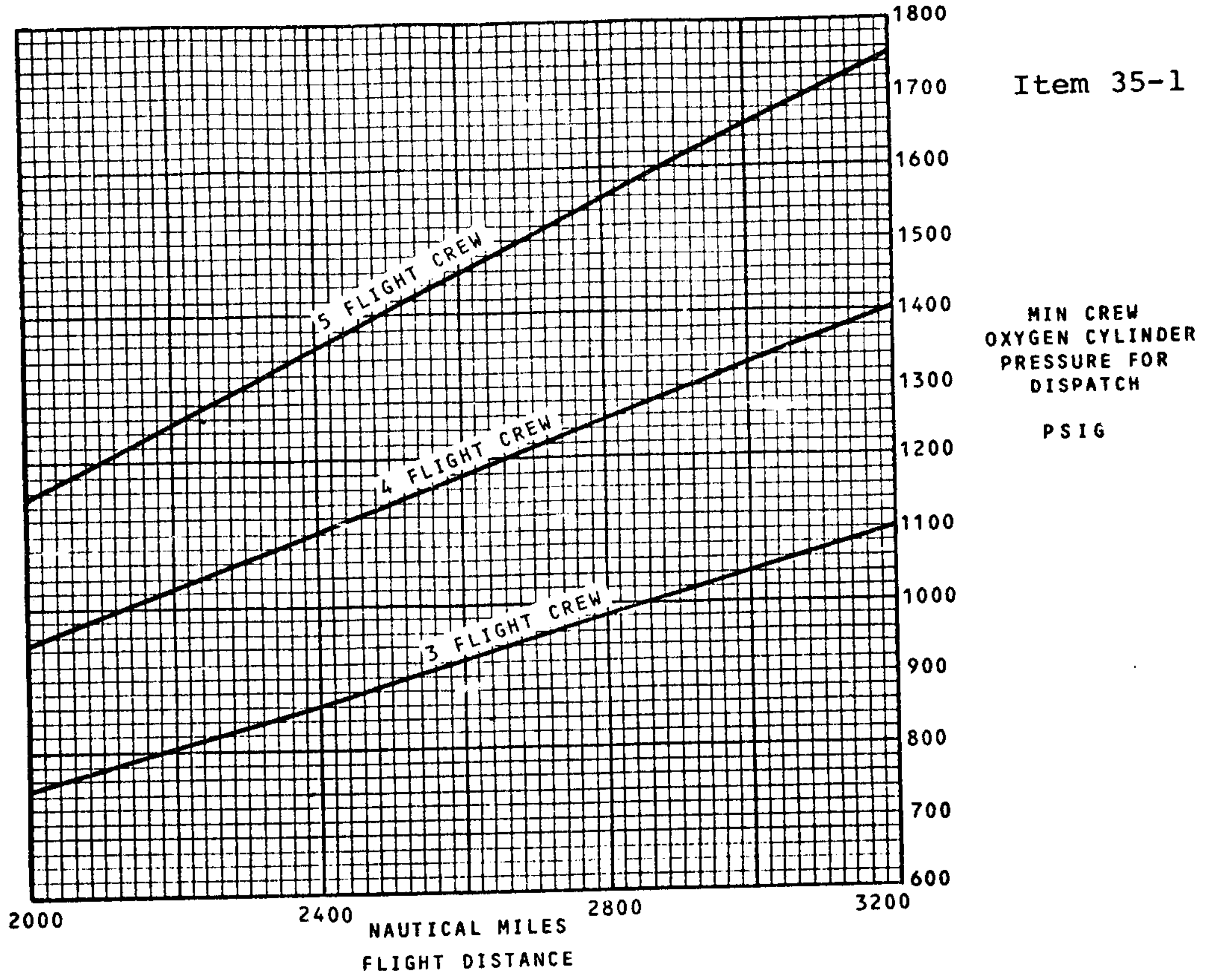
OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
32.6 - Braking System	
(a) Brake Units See Performance Manual section 5 for performance penalty. The remaining 7 brake systems must be fully serviceable. If one brake and one thrust reverser are inoperative they must be on opposite sides of the aircraft and both performance penalties applied.	Disconnect the normal hydraulic supplies to the affected brake in accordance with Maintenance Manual 32.42.00 P.301. If one brake and one thrust reverser are inoperative they must be on opposite sides of the aircraft. If failure of brake involves locked wheel ('R' lt on and Overload MIs cloverleaf and white) remove the carbon discs of the affected brake and disconnect normal and emergency hydraulic supplies in accordance with Maintenance Manual 32-42-11 P.401.
(b) Anti-Skid Channels (i) 'R' lt continuously on. If the maintenance procedure establishes an indication fault, normal flight is permitted provided that the Overload MI shows black. If the maintenance procedure establishes a system fault see Performance Manual Section 5 for performance penalty. Since the maintenance procedure renders the associated brake inoperative, read also item (a) Brake Units.	To determine whether indication or system fault:- - ensure wheels chocked and all control surface and intake areas clear. - pressurise normal brakes - depress the brake pedals - observe brake piston movement at the affected brake unit - reset controls as required. If...piston movement observed, the fault is indication only. Confirm serviceability of associated Overload channel in accordance with Maintenance Manual 32-43-00 P.501, before each flight. If...there is no piston movement, disconnect the normal hydraulic supplies to the affected brake in accordance with Maintenance Manual 32-42-00 P.301.
(ii) 'R' lt continuously off If the maintenance procedure establishes an indication fault, normal flight is permitted provided that the Overload MI shows black. If the maintenance procedure establishes a system fault see Performance Manual section 5 for performance penalty. Since the maintenance procedure renders the associated brake inoperative, read also item (a) Brake Units	To determine whether indication or system fault:- - ensure wheels chocked and all control surface and intake areas clear. - pressurise normal brakes - depress the brake pedals - operate anti-skid test sel. - observe brake pistons release at the affected brake unit. - reset controls as required. If...brake release is observed, the fault is indication only. Confirm serviceability of associated Overload channel in accordance with Maintenance Manual 32-43-00 P.501, before each flight.

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
32.6 - Braking System (contd)	If...there is no brake release, disconnect the normal hydraulic supplies to the affected brake in accordance with Maintenance Manual 32-42-00 P.301.
(c) Overload Channels (Cloverleaf indication plus white MI). If the maintenance procedure establishes an indication fault, normal flight is permitted provided that no Release light is permanently on above 10 kts. If the maintenance procedure establishes a system fault, see Performance Manual section 5 for performance penalty. Since the maintenance procedure renders the associated brake inoperative, read also item (a) Brake Units.	To determine whether indication or system fault:- - ensure wheels chocked and all control surface and intake areas clear. - pressurise normal brakes - depress the brake pedals - observe brake piston movement at the affected brake unit. - reset controls as required. If...piston movement observed, the fault is indication only. No further maintenance action required provided that the associated anti-skid channel is verified not unserviceable before each flight. If...there is no piston movement, disconnect the normal hydraulic supplies to the affected brake in accordance with Maintenance Manual 32-42-00 P.301.
32.9 - Brake Accumulator Pressure Indicator None	Check the pressure (See Maintenance Manual 32-44-66 Page 301).
32.10 - Brake Temperature Sensor See Performance Manual section 5 "One Wheelbrake or Anti-skid inoperative" for performance limitations.	Disconnect normal and emergency hyd. supply to affected brake(s) and check that no carbon disc is broken. If any disc is broken, remove affected heat sink (See Maintenance Manual 32-42-11 Page 401) If Warning light permanently ON, disconnect affected warning light.
32.12 - Overheat Warning Check, at Flight Engineers Station, before take-off roll and before landing gear retraction that no brake temperature warning light is illuminated.	None

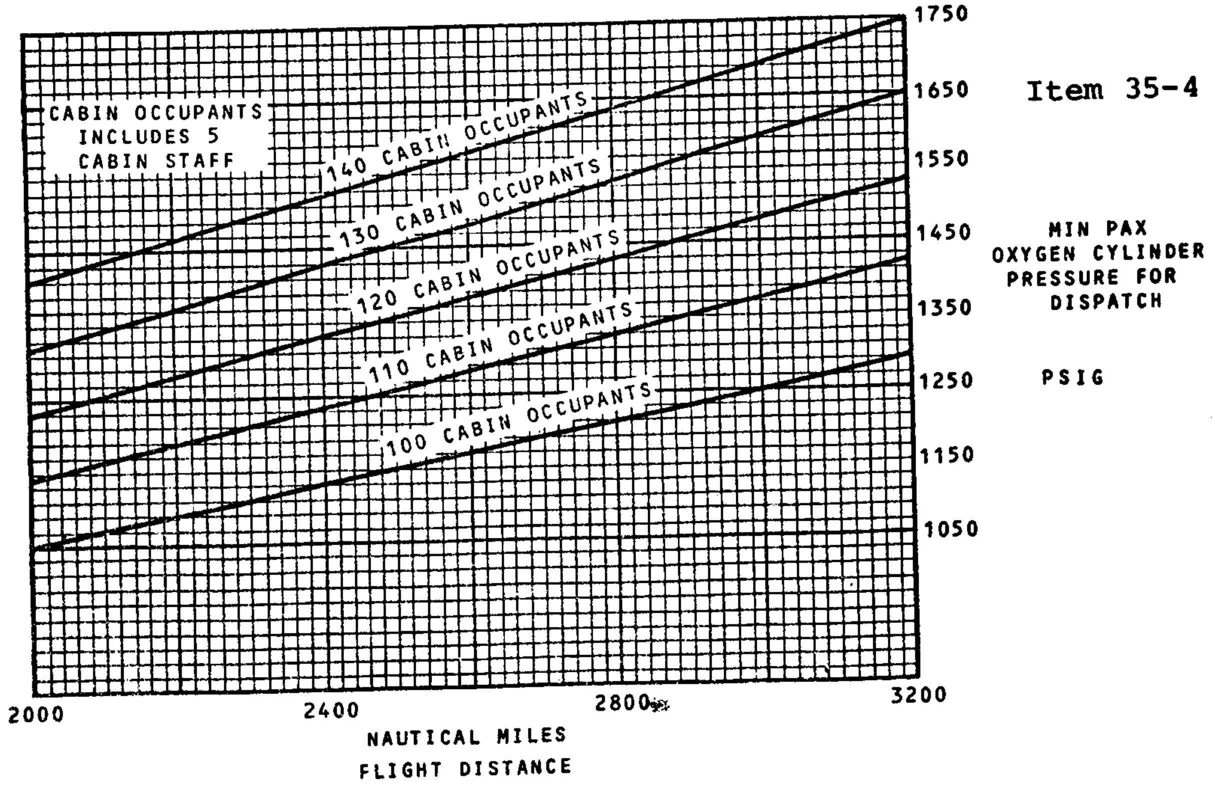
OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
32.14 - Brake Fan	
A. If the associated wheel is part no. AH53047 (6 fusible plugs) Apply performance penalties in accordance with Performance Manual section 5, "Dispatch with one wheelbrake or anti-skid inoperative".	Disconnect the normal and emergency hydraulic supply to the affected brake in accordance with Maintenance Manual 32-42-11. ONLY ONE BRAKE UNIT PER AIRCRAFT MAY BE ISOLATED.
B. If the associated wheel is part no. AHA1017 (14 fusible plugs) The aircraft may be dispatched without penalty.	No action.
32.18 - Water Anti-ingestion Deflector None	When a deflector is damaged, it must be partly or totally removed to avoid fouling of the structure. After damage to the nose wheel deflector at least the hinged part must be removed from affected side. (See Maintenance Manual 32-11-12 or 32-11-13 or 32-21-11 Page 401).

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
34.4 - ASI	
b) V_{MO} Indication	
None	Check the overspeed alarm by self test No.2 on the ADC's (See Maintenance Manual 34-11-00 Page 501.)
34.9 - a) Incidence Indicator	
None	Check the Stick Shaker and one Stick Wobbler as detailed on page 05.03.04A or 05.03.04B of this section.
34.23 - Radio Altimeter	
No. 1 U/S, trip CB RAD ALT 1 SUP 2.213 D8 No. 2 U/S, trip CB RAD ALT 2 Sup 13-216 F19	None

Item 35-1



Item 35-4



MAINTENANCE PROCEDURE

56.1 CABIN, FLIGHT DECK AND VISOR WINDOWS

General

Visually inspect the flight compartment windows, inside and outside, and the visor and passenger compartment windows from the outside, for allowable damage (Ref.Table No.1).

To inspect the transparent panels of the insulated covers fitted to each direct-vision window and side window, first release fasteners around the edge of the transparent panel, and then remove the panel.

The visor must be in the fully raised position before inspecting it, and in the lower position before inspecting the external surface of the windshield.

Extreme care must be taken at all times to prevent accidental damage and scratching of the glass panels.

Allowable Damage

A. Inspection

(1) Visually inspect all windows for, delamination, bubbles, cracks, chipping, scratches, peel splintering (these appear as a series of conchoidal chips radiating from a common centre) and discolouration. Reference Table No.1 and key for acceptable levels of these defects.

(2) Visually inspect the critical and secondary optical areas of the windshield (Ref.Fig.No.1) for vision impairment.

B. Check

(1) Check the windshield, direct vision, side-windows and the visor for electrical faults.

See Maintenance Manual 30.41.00

GLAZING / TYPE OF DAMAGE	WIND SHIELD PANEL	DV & SIDE WINDOWS		CABIN WINDOWS		VISOR WINDOWS
		HEAT SHIELD	PRESSURE PANEL	HEAT SHIELD	PRESSURE PANEL	
Delamination	1 abc&d	-	1(a) (b)	-	1(a) (b)	1 abc&d
Bubbles	2 ab &c	-	2(a)	-	2(a)	2 ab & c
Cracks	3(a)	3(a)	3(a)	3(b)	3(b)	3(c)
Chipping	4, 5	4	4	4	4	5, 6
Scratches	7,8,9	7, 8	7, 8	7, 8	7, 8	7, 8

TABLE ONE

MAINTENANCE PROCEDURE

56.1 Cont.

KEY TO TABLE ONE

1. DELAMINATION Delamination is acceptable if:

(a) Vision is acceptable, if delamination is within the limits shown in Fig.2 or Fig.3.

(b) Delamination has not resulted in surface peel splintering of glass.

(c) Arcing or severe local overheating does not occur when heating element is switched on.

(d) The heating element resistances are within their specified limits (See Maintenance Manual 30.41.00 page 501).

2. BUBBLES

Bubbles are acceptable if:

(a) Vision is acceptable.

(b) Arcing or severe local overheating does not occur when heating element is switched on.

(c) The heating element resistances are within their specified limits (See Maintenance Manual 30.41.00 Page 501).

3. CRACKS

(a) Replace panel before next flight

(b) Panel replacements in certain cases may be deferred, provided not more than three panels are affected, subject to Flight and Maintenance Limitations as follows:

Damage Case 1 - Crack in the outer pane of the pressure panel.

Action - Replace window not later than at first return to main base - not exceeding 6 flights.

Damage Case 2 - Crack in the inner pane of the pressure panel.

Action - Replace window not later than at first return to main base - not exceeding 6 flights.

Cont......

DESPATCH DEVIATION PROCEDURE
WINDOWS

MAINTENANCE PROCEDURE

56.1

CRACKS 3(b) (Cont)

Damage Case 3 - Crack in both panes of the pressure panel.

Action - Replace window before further flight - not exceeding one positioning flight at less than or equal to 4 P.S.I.

Damage Case 4 - Crack in the heatshield pane.

Action - Replace window not later than at first return to main base - not exceeding 6 flights provided window remains intact. (i.e. no pieces missing). If window is not intact (i.e. pieces missing) replace window before further supersonic flight not later than at first return to main base - not exceeding 6 subsonic flights.

3. (c) Panel replacement in certain cases may be deferred, subject to Flight and Maintenance Limitations as follows:

Damage Case 1 - If visual inspection shows that only one visor panel is affected and the glass is still in place and the other ply is not cracked or damaged.

Action - Replace panel not later than first return to main base - not exceeding 3 flights. Trip the heater circuit breakers for the affected panel, ref. below:

VISOR	PANEL	GRID REF.
LH flat visor HTR sup.	14-215	G 5
RH flat visor HTR sup.	13-216	G13
LH flat visor HTR cont.	15-215	C11
RH flat visor HTR cont.	15-216	C15
LH curved visor HTR sup.	14-215	G 8
RH curved visor HTR sup.	13-216	G10
LH bottom and curved visor HTR cont.	15-215	G12
RH bottom and curved visor HTR cont.	15-216	C16
LH bottom visor HTR sup.	14-215	E 9
RH bottom visor HTR sup.	13-216	B10

DESPATCH DEVIATION PROCEDURE WINDOWS

MAINTENANCE PROCEDURE

56.1

CRACKS 3(c) (Cont)

Damage Case 2 - If visual inspection shows both plies cracked in any one panel.

Action - Replace panel before next flight.

Damage Case 3 - If more than one panel affected.

Action - It is permissible to leave one affected panel; this must comply with Case (1) above. All other affected panels must be changed before the next flight.

CHIPPING

4. Chipping of any ply, other than those as in item 5, and 6 below, is critical; panel must be replaced.

5. Edge chipping of an outer heated facing ply of the windshield or visor glazings is not critical if chips are less than 0.25 in (6.35 mm) long.

6. Edge chipping of a visor inner ply is not critical if the chips are less than 0.25 in (6.35 mm) long.

SCRATCHES

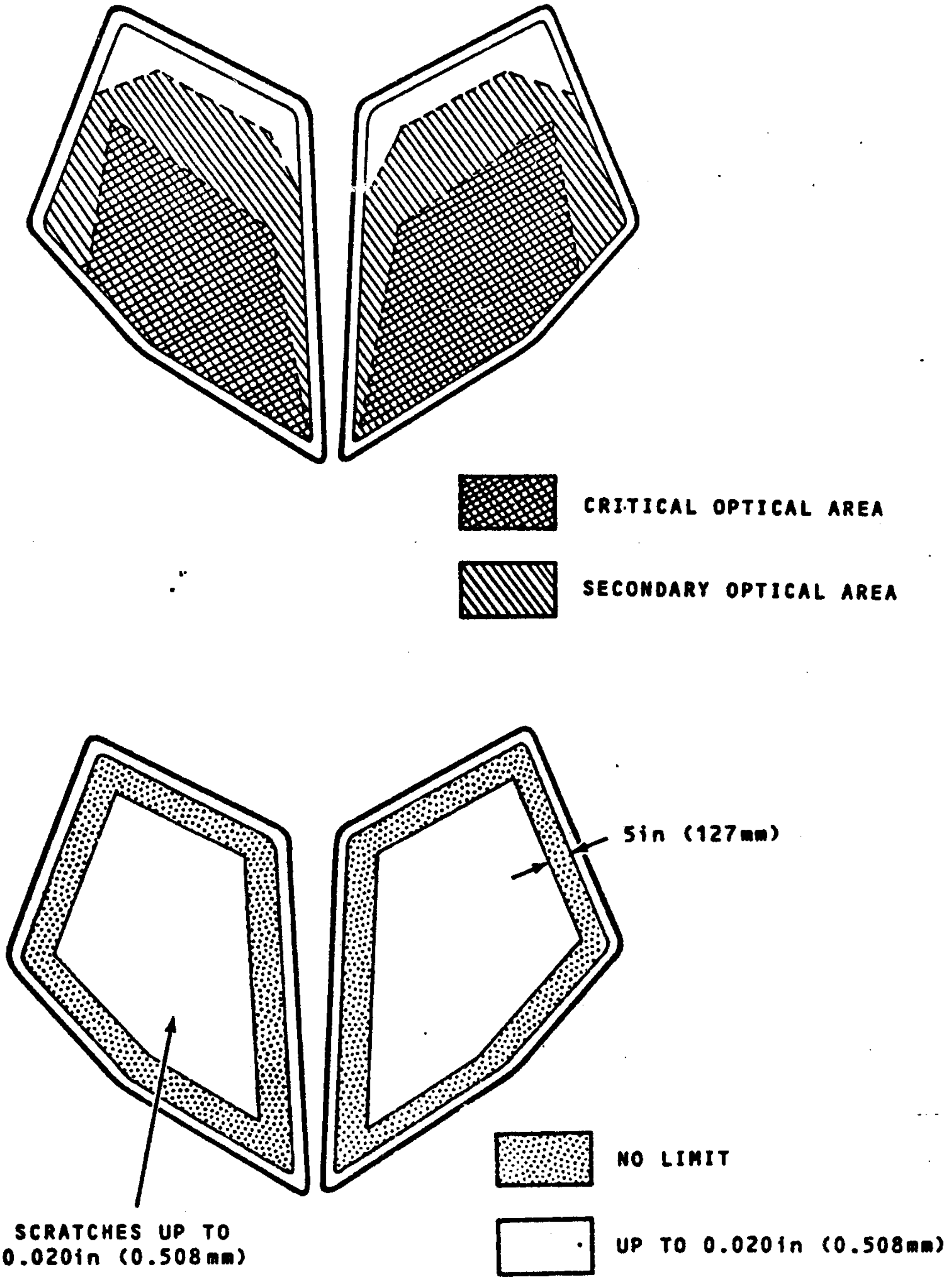
7. Light scratches are not critical provided vision is acceptable.

8. Deep scratches, exceeding 0.003 in (0.076 mm) in depth, in any window ply other than the windshield outer ply are critical; panel must be changed.

9. Deep scratches in the windshield outer ply up to 0.020 in. (0.508 mm) maximum are permitted (See Fig. 1).

MAINTENANCE PROCEDURE

ALLOWABLE DAMAGE - GLAZINGS



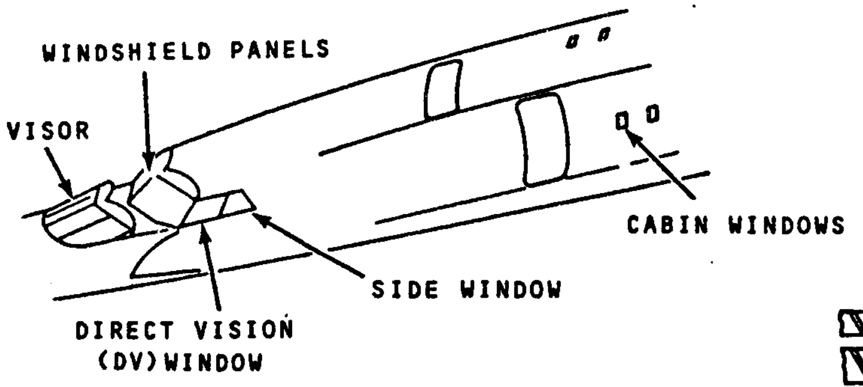
Windshield Optical Areas
FIG ONE

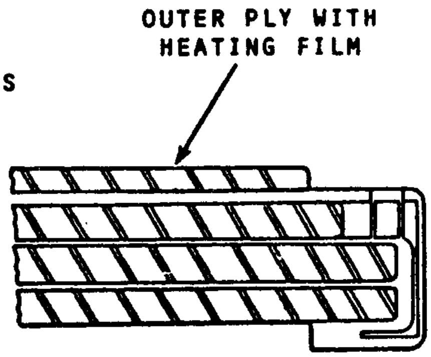
DISPATCH DEVIATION PROCEDURE

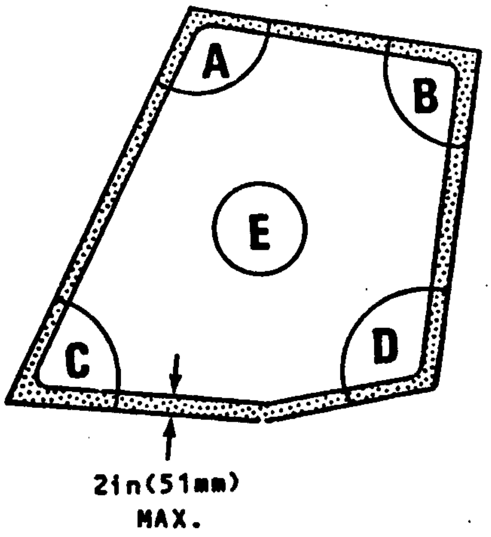
WINDOWS

MAINTENANCE PROCEDURE

ALLOWABLE DAMAGE - GLAZINGS







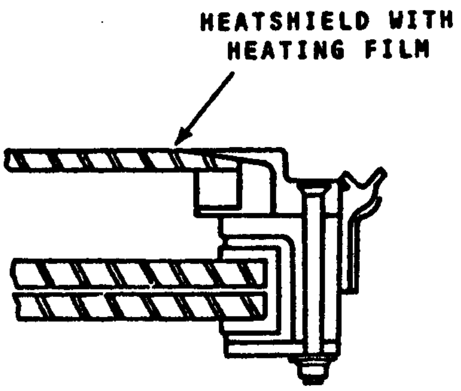
▨ COMPLETE DELAMINATION IS ACCEPTABLE

☐ LOCAL DELAMINATION - FOR ANY SINGLE AREA (A TO E FOR EXAMPLE) EXCEEDING 40sq in (25805sq mm), REPLACE PANEL.

WINDSHIELD

PRESSURE PANELS

FOR SUM TOTAL OF DELAMINATION EXCEEDING 150sq in (96774sq mm) FOR THE DV WINDOW, AND 120sq in (77470sq mm) FOR THE SIDE WINDOW, REPLACE PANEL



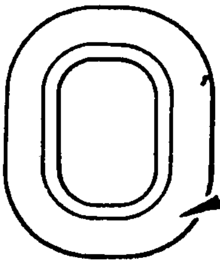
DV AND SIDE WINDOWS (TYPICAL)

Windshield, DV and Side Windows

FIG TWO

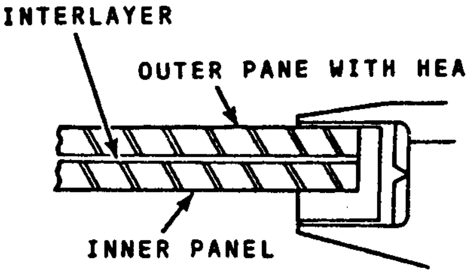
MAINTENANCE PROCEDURE

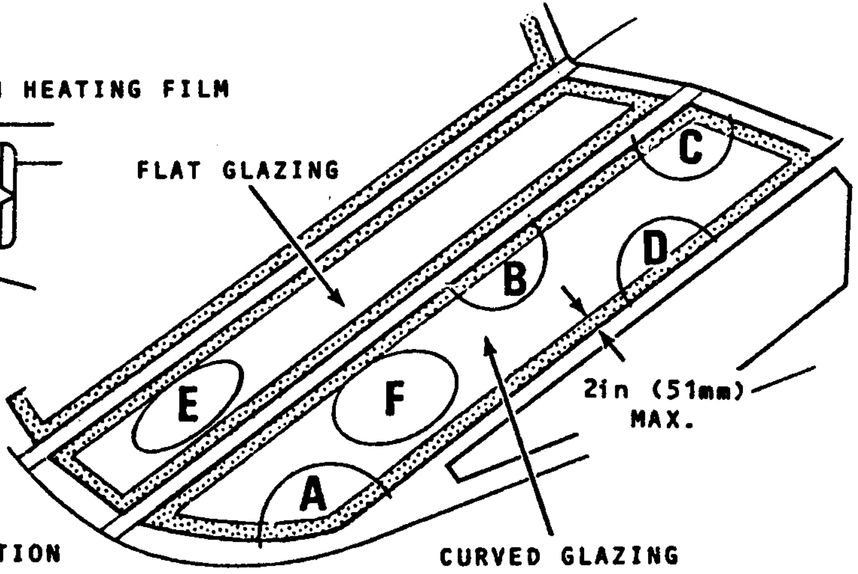
ALLOWABLE DAMAGE - GLAZINGS



IF THE SUM TOTAL AREA OF DELAMINATION EXCEEDS 15 sq in (9677 sq mm) ON ANY ONE PANEL, REPLACE THE PANEL.

PASSENGER COMPARTMENT WINDOWS



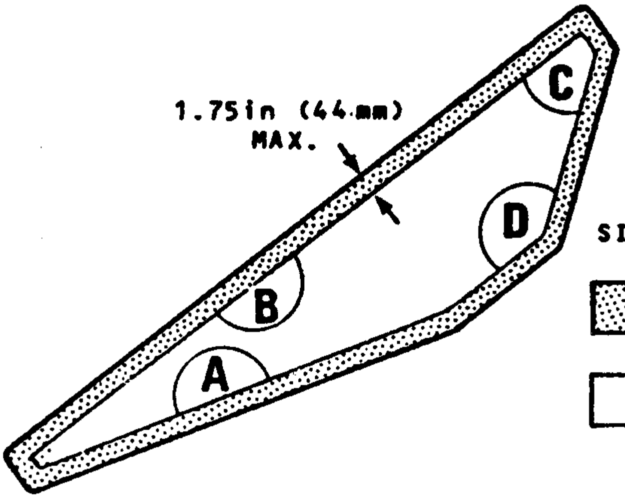


MAIN FLAT AND CURVED PANELS

▨ COMPLETE DELAMINATION IS ACCEPTABLE.

☐ LOCAL DELAMINATION - FOR ANY SINGLE AREA (A TO F FOR EXAMPLE) EXCEEDING 20sq in (13208sq mm) WITH IMPAIRED VISION - REPLACE PANEL.

VISOR PANELS



SIDE PANELS

▨ COMPLETE DELAMINATION IS ACCEPTABLE.

☐ LOCAL DELAMINATION - FOR ANY SINGLE AREA (A TO D TO EXAMPLE) EXCEEDING 15sq in (9677mm) WITH IMPAIRED VISION - REPLACE PANEL.

Visor and Passenger Windows

FIG THREE

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DESPATCH DEVIATION PROCEDURES

INTAKE CONTROL

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
71.2 - Door Actuators and Mechanism Apply procedure INTAKE LIGHT ON, as required.	None
71.3 - Ramp Actuator and Mechanism Apply procedure INTAKE LIGHT ON, as required.	**Inch or manually move to subsonic geometry**
71.9 - Auxiliary Vane Indicator **None**	**Physically operate vane to fully open and close before flight.**

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DESPATCH DEVIATION PROCEDURES

FUEL AND ENGINE CONTROLS

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
73.4 - Fuel Heater System Manual If the Fuel Temp. falls below +20°C, FUEL HEATER SW. ON When Fuel Temp. reaches +70°C FUEL HEATER OFF. If the fuel Filter light comes on, apply procedure "FUEL FILTER LIGHT ON".	None

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
75.1 - Engine Anti-Ice (b) Failed On If the OAT at take-off is above +3°C, see Performance Manual section 5, CONTINUOUS USE OF ENGINE ANTI-ICE, for performance penalty. Unrestricted engine operation is permitted but, with Total Temperature above 80°C and the associated engine(s) N_2 greater than 96%, damage may occur to the cable to the No.1 bearing vibration pick-up. In addition, carbon formation in the LP compressor front bearing chamber and scavenge pipe may occur, this ultimately leading to a total loss of engine oil and hence engine shut-down.	1. If the defect cannot be rectified and operational considerations allow the aircraft to be despatched with the system failed off, close the valve in accordance with Eng. Alert No.75 (RR SB OL 593 75 11). 2. If the aircraft is despatched with the system failed on and operates at a Total Temperature of greater than 80°C with the associated engine(s) N_2 at greater than 96%, then after the flight the following Maintenance actions must be applied:- (a) either the defective system must be repaired, or the failure mode must be reversed so that the system is failed off. See Maintenance Manual 71.00.22 Sheet 104 or Rolls-Royce Service Bulletin OL 593-75-11 or Eng. Alert No.75 (b) either the cable to the No.1 bearing vibration pick-up must be replaced (See Maintenance Manual 77.33.01 page 401) or the Aircraft may be operated to the requirements of the eight flight waiver on the vibration indication system (ATA 77, Item 4).

ATA 76 ENGINE CONTROL

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
76.1 Engine Electronic Control System CAUTION: If, after 100 Kt., the associated engine suffers a partial thrust loss and the take-off is abandoned, then if the engine has failed to respond to throttle lever movement when idle is selected, it should be shut down as soon as possible after selection of reverse thrust.	

77 - ENGINE INDICATION

77.1 - Engine Instruments

1 - TAKE-OFF MONITOR INOPERATIVE

(a) "Clear to Go" light failed On or OFF

If the Go light is failed On, it should be masked before departure. The following procedure then applies to Go light failed On or Off:-

Apply normal engine monitoring procedures, in particular observe that $N2$ achieves minimum value for take-off and Area indication lies within the white sector on the subject engine.

The remaining three Go lights must be on at 100kts or the take-off abandoned.

(b) "CON" light failed OFF

Apply normal engine monitoring procedures, in particular observe that N_2 achieves minimum value for take-off and Area indication lies within the white sector on the subject engine.

The "One Go Light Off at 100kts", procedure may be applied on any one engine.

On the subject engine,
- during in-flight reverse, monitor Area and cancel its reverse selection if Area is greater than 15%
- during landing reverse do not increase its thrust above reverse idle until Area is less than 15%.

(c) "CON' light failed ON.

Mask the failed CON light before departure.

The associated Go light will be inoperative.

Apply normal engine monitoring procedures, in particular observe that $N2$ achieves minimum value for take-off and Area indication lies within the white sector on the subject engine.

The remaining three Go lights must be on at 100kts or the take-off abandoned.

On the subject engine,
- during in-flight reverse, monitor Area and cancel its reverse selection if Area is greater than 15%
- during landing reverse do not increase its thurst above reverse idle until Area is less than 15%.

2 - FUEL FLOWRATE INOPERATIVE OR P7 INOPERATIVE

Set the Fuel Flowrate bug (or P7 bug) to the normal value. The associated Go light will thus be inoperative.

Apply normal engine monitoring procedures, in particular observe that N_2 achieves minimum value for take-off and Area indication lies within the white sector on the subject engine.

The remaining three Go lights must be on at 100kts or the take-off abandoned.

3 - N_1 INOPERATIVE

Apply normal engine monitoring procedures.

4 - N_2 INOPERATIVE

At speeds up to and including 100kts, failure of the N_2 instrument is covered by the general instrument "sensibly in line" scan which is normally carried out and by operation of the Go light.

At speeds above 100kts, engine failure will be indicated by N_1.

The take-off must be abandoned if the associated Go light fails to illuminate by 100kts. The "One Go Light Off at 100kts" procedure may be applied to any one of the other three engines.

5 - EGT INOPERATIVE

(a) Starting

The engine may only be started if the yellow EGT warning light is extinguished with the Throttle Master selector at MAIN or ALTERN.

(b) Take-Off

If the engine is controlled by an Engine Control Unit with part no. A6A16/24AL (AL amplifier) the following requirements must be observed:-

(i) The aircraft may be dispatched for no more than 3 consecutive flights with an EGT instrument inoperative.

(ii) A take-off performance penalty must be applied and the associated P7 and Fuel Flowrate bug settings reduced. See Performance Manual section 5.

(b) Take-Off

(iii) Manually throttle the engine to an N_2 of 1% lower than the other three engines.

(iv) The take-off must be abandoned if any Go light fails to illuminate by 100kts.

(v) If the engine is controlled by any other Standard of Engine Control Unit no restrictions or special procedures are required.

6 - AREA INOPERATIVE

Failure of an Area instrument is covered by the general instrument "sensibly in line" scan which is normally carried out, the CON light remaining off and the operation of the Go light.

The take-off must be abandoned if the associated Go light fails to illuminate by 100kts. The "One Go Light Off at 100kts" procedure may be applied to any one of the other engines.

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DISPATCH DEVIATION PROCEDURES

OPERATIONAL PROCEDURES

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
77.4 - Vibration Indication System None.	No.1 Bearing Vibration Indication System Normal operation is permitted for up to eight flights provided the defect is proved to be in the indication system by carrying out checks detailed in Chapter 71.00.32 of the M.M. (TR No. 71-073 and 71-074) When the defect is confirmed to be in the indication system, inhibit the defective Vibration Warning Channel as follows:- (a) Disconnect the free electrical plug from fixed connector mounted on engine at 40° approx. from bottom centre line by a bracket supported from I.G.V. - L.P. compressor casing joint. (b) Attach to the free plug a connector HTMA-0-E-10SL-3P181 suitably wired to short circuit pins 'a' and 'b'. (c) Support the free plug and its shorting connector by securing it to the loom or a convenient attachment point.

OPERATIONAL PROCEDURES

78.1 Secondary Nozzles

The inoperative nozzle is to be locked within the range of 10° to 27°. The preferred position, for overall performance reasons, is 10° and where practicable the ground-crew should be requested to wind the nozzle to 10° before the following operational procedures are applied:

Before Engine Start

Verify that the locked bucket position is between 10° and 27°.

Trip the associated BUCKET CONTROL UNIT SUPPLY CB.

CIRCUIT BREAKER	PANEL	GRID/REF
ENG 1 BUCKET CONT SUP	14-215	E12
ENG 2 BUCKET CONT SUP	13-215	G14
ENG 3 BUCKET CONT SUP	13-216	C6
ENG 4 BUCKET CONT SUP	14-216	C6

Notes:

1. Tripping the B.C.U. supply C/B enables the "GO" light to operate. irrespective ot secondary nozzle position.
2. Tripping the B.C.U. supply C/B immobilises electrically the secondary nozzle at the position it is in, but causes the associated secondary nozzle position indicator to read 0°.

During Taxi Out

Omit the Reverse ASOV check on the associated bucket pair.

MAINTENANCE PROCEDURES

NOTES:

1. The aircraft may be despatched with an inoperative secondary nozzle provided it is locked within the range 10° to 27°. Wherever practicable, it is recommended that the nozzle is set to 10° (as described after these notes).
2. If the nozzle has failed outside the range 10° to 27° due to damage or jamming of a bucket ballscrew gearbox, it is permissible for the aircraft to be despatched with one gearbox missing subject to the following requirements:-
   a) the only gearbox which is allowed to be missing is the bottom right-hand unit as viewed from the rear of the aircraft looking forward. If the defective gearbox is not in that position, it should be removed and the gearbox from the bottom right-hand position substituted.
   b) the bottom right-hand gearbox flexible shaft must then be removed and the nozzle must then be wound to and mechanically locked at 10° as described below.
   c) the missing gearbox must be replaced when the aircraft next returns to main base.
3. Except as specified in Note (2) above, it is not mandatory (although it is desirable) to mechanically lock the nozzle at the desired position, since electrical locking is achieved when the aircrew trip the B.C.U. supply C/B.
4. Failure of the nozzle to schedule fully to 0° at speeds above M1.1 need not necessarily be regarded as a system fault that requires buckets to be locked. Provided that the nozzle achieves a position in the range 0° to 5° above M1.1 and schedules correctly below M1.1, its operation may be considered satisfactory and no performance penalties are incurred.

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES

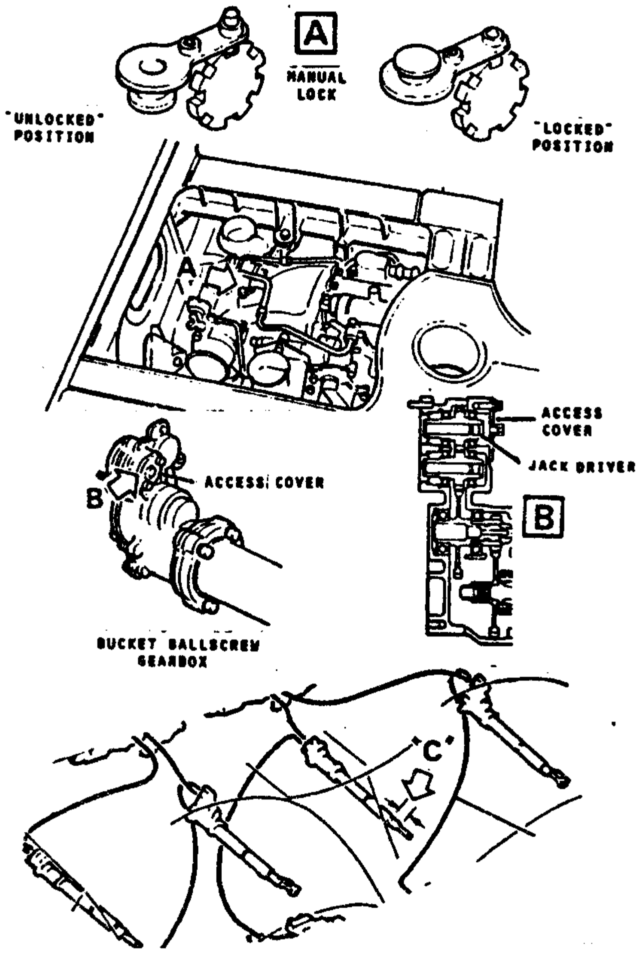
(1) Remove access panels, for drive unit and any one ballscrew gearbox, for appropriate bucket.

Eng.1	Eng.2	Eng.3	Eng.4	
418AT	427AT	438AT	447AT	Drive Unit
417AT	428AT	437AT	448AT	Outer top gearbox (ref.)

(2) Remove access cover from appropriate bucket ballscrew gearbox B below.

(3) Insert .314" or 8mm A/F Hex Bar into jack driver and rotate either manually or with power tool, to set bucket angle to 10° (10° is equivalent to a movement of the jack of 37.6 mm measured at 'C'). See illustration.

(4) On Drive Unit remove socket headed retaining screw, lift and invert locking plate, replace. Ensuring pin is correctly located, refit socket headed retaining screw and tighten, See A.



OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
78 - 4 One N.A.S.U. Inoperative After Engine Start Set NASU test sel in turn to Test 1 and Test 2. Observe that at one of the positions the Secondary Nozzles remain at 21° ("Failed" NASU selected) and at the other position that the Secondary Nozzles go to 0° (Operative NASU selected). Return NASU Test Sel to NORM and observe Secondary Nozzles return to 21°. Notes: 1. If the Nozzles light is on because of an internally detected fault on one NASU, powerplant operation is unaffected. 2. If the Nozzle light is on because of the loss of the AC power supply to one NASU the following effects/procedures should be noted. (a) The throttle control units supplied by the inoperative NASU will cause the CRUISE rating to operate at its highest (i.e. warm day) level. If cruising at static temperatures colder than -51°C either change throttle lanes on the affected engines or throttle the engines manually to the required value of N_1, N_2 and E.G.T. (b) The throttle control units supplied by the inoperative NASU will cause the engines to operate on the LO schedule if the ENGINE CONTROL SCHEDULE sels are set to AUTO and FLYOVER or AUTO and APPROACH. The desired schedules may be obtained by changing throttle lanes on the affected engines.	Maintenance to diagnose whether NASU failure is internal (Comparator) or due to loss of A.C. power supply and inform aircrew accordingly.

DESPATCH DEVIATION PROCEDURES

EXHAUST & REHEAT

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
3. NASU/THROTTLE CONTROL UNIT Interdependence.	

	THROTTLE CONTROL UNIT			
	ENG 1	ENG 2	ENG 3	ENG 4
NASU 1 SUPPLIES	MAIN	ALTERN	ALTERN	MAIN
NASU 2 SUPPLIES	ALTERN	MAIN	MAIN	ALTERN

4. There will be no indication of a subsequent failure of the remaining N.A.S.U. The Engine Control Schedule Lts should therefore be closely monitored for correct indication throughout the flight. If at any time, the Lts indicate incorrect E Schedule operation, apply procedure "NOZZLE LIGHT ON NOT ASSOCIATED WITH A.D.C. FAILURE".

DESPATCH DEVIATION PROCEDURES

EXHAUST & REHEAT

OPERATIONAL PROCEDURES

78.5 - Reheat Fuel Control System
One Reheat System inoperative

BEFORE TAKE-OFF

Secondary Air Door Switch ..Shut
(Affected Engine)

NOTE: Ensure that the fuel flow meter bugs for the affected engine are set at zero.

The "REHEAT" selectors for all four engines must be operated in the normal manner.

NOTE: An engine with inoperative reheat, selection of "CONTINGENCY" on the "REHEAT" selector will cause the "dry" engine to operate as its appropriate contingency thrust level.

See Performance Manual Section 5 for limitations.

AFTER TAKE-OFF

At approximately 220Kts
ENGINE CONTROL SCHEDULE LIGHTS
(Affected engine) LO off
HI on

At start of Noise Abatement:

ENGINE CONTROL SCHEDULE LIGHTS
(Affected Engine) HI OFF
F/O on when reheat selected OFF

Above 250 Kts
SECONDARY AIR DOOR sel.
(Affected Engine .... AUTO

NOTE: The requirement to keep the Secondary Air Doors shut below 250 knots is for dispatch with known reheat failure, it is not applicable if reheat failure occurs during take-off

MAINTENANCE PROCEDURES

Check that the "automatic contingency rating selection" signal for the affected engine is functioning, as follows.

Electrical Power .... ON
REHEAT SWS (all engines) . Verify OFF
ENG.RATING MODE SWS
(all engines) .... Verify TAKE-OFF
T/O lt .... ON
T/O MONITOR pb .... Push to ARM and latched

REHEAT sel.
(Affected Engine Only).... RHT
T/O lt .... Remains On
CTY. lt .... Flashing

CAUTION: If the CTY light remains OFF. the "automatic contingency rating selection" signal is not functioning and dispatch is not permitted

REHEAT Sel.
(Affected Engine .... OFF
CTY. lt .... OFF
T/O MONITOR pb .... Pull to INHIBIT

Check that the "reheat off" signal to the throttle control units for the affected engine is functioning, as follows:

THROTTLE MASTER Sels.
(all engines) .... Main or ALTERN.

ENG. RATING MODE Sws
(all engines) .... Verify TAKE-OFF

ENGINE CONTROL SCHEDULE
Sels .... NORMAL and HI

ENGINE CONTROL SCHEDULE
lts. (all engines) .... Verify LO
REHEAT Sels (all engines). Verify OFF
U.C. Weight sw c/bs ..... Trip (See Table below)

CIRCUIT BREAKER	PANEL	GRID REF
R.H.U.C. Weight Sw. 'A' Sys. Sup.	1.213	M18
L.H.U.C. Weight Sw. 'B' Sys. Sup	3.213	B8

DESPATCH DEVIATION PROCEDURES

EXHAUST & REHEAT

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
78.5 contd.	

ENGINE CONTROL SCHEDULE lts (all engines) . . . . HI

CAUTION: If, for the affected engine, the HI lt remains off and the LO lt remains on the "reheat off" signal to the throttle control units is not functioning and dispatch is not permitted.

U.C. Weight Sw. c/b's . . . . Reset

If the "automatic contingency rating selection" signal and the "reheat off" signal are functioning as required, the following maintenance procedure to inhibit the affected reheat system must be carried out before the aircraft is dispatched.

1. Connect a voltmeter to measure 28 V.D.C. between pin W of the affected reheat electronic control units (R.E.C.U.) test plug and earth.

2. Advance throttle lever of affected engine to approximately mid-travel.

3. Select reheat switch of affected engine to RHT and check voltmeter reads approximately 28V. Select reheat switch to OFF.

4. At rear racking or underfloor relay panel as convenient, disconnect, tape and stow the appropriate cable for the affected reheat system (See following tables).

Table 1 - Rear Racking

RECU	CABLE IDENT	SHELF	TERMINAL BLOCK	STUD
1	1K209 x K	7.243	UG2927	1
2	2K209 x H	7.243	UG2927	2
3	3K209 x H	7.244	UG2928	1
4	4K209 x H	7.244	UG2928	2

DESPATCH DEVIATION PROCEDURES

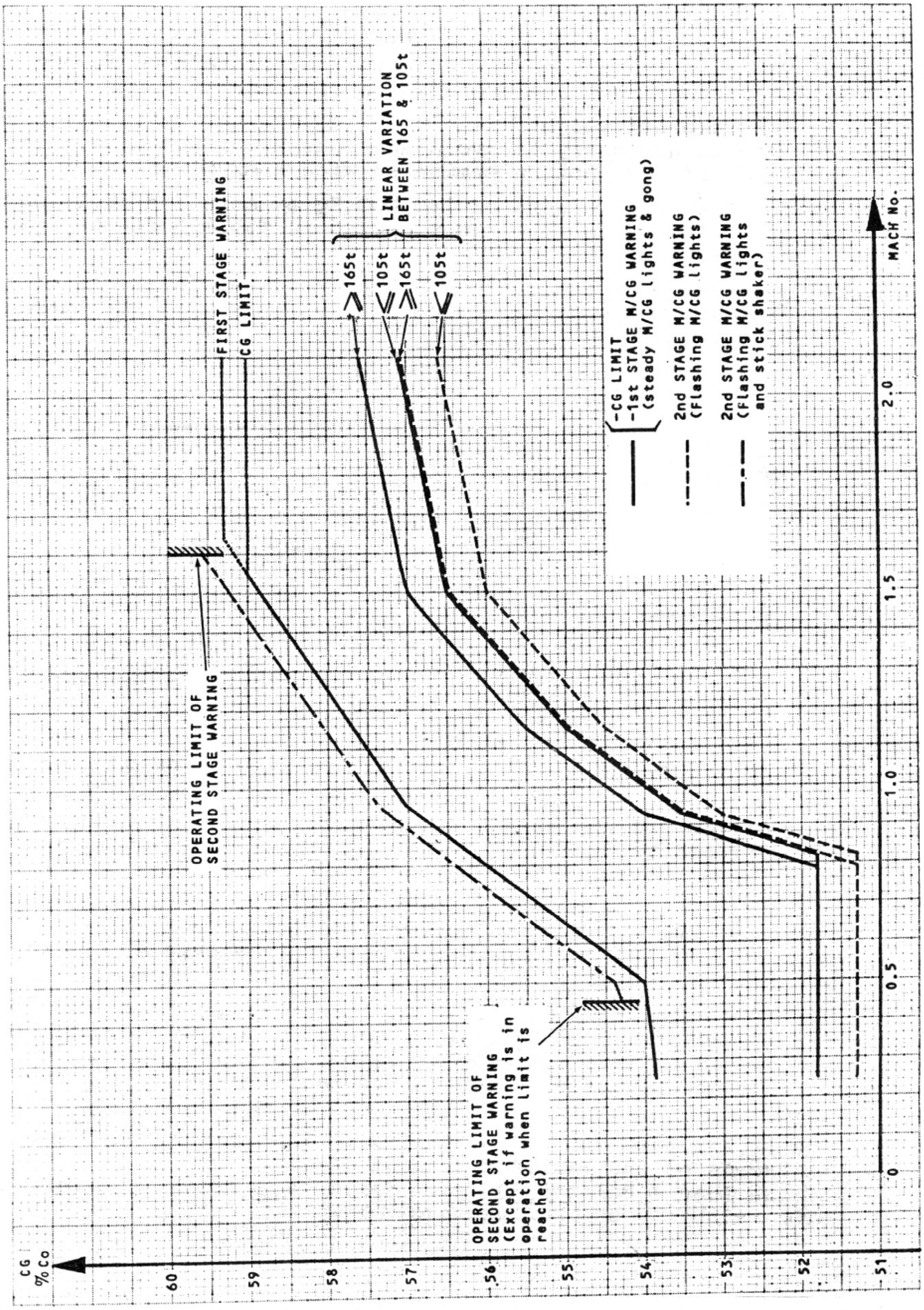
OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
78.5 contd.	Table 2 - Underfloor relay panel - Disconnect cable from terminal A_1 tape and stow

RECU	PANEL	RELAY
1	19-123	1K 727
2	19-123	2K 727
3	20-123	3K 727
4	20-123	4K 727

OPERATIONAL PROCEDURES	MAINTENANCE PROCEDURES
	5. Select reheat switch of affected engine to RHT and check that Voltmeter remains at 0. CAUTION: If there is still a 28V D.C. signal on pin W, dispatch is not permitted. 6. Select reheat switch of affected engine to OFF and disconnect Voltmeter.
78.6 - Reheat Ignition System One Reheat System Inoperative Same procedure as for 78.5	Same procedure as for 78.5

FIRST ISSUE

IN-FLIGHT CG LIMITS
(Except for Take-off and Landing Phases)



(Unchanged)